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Meeting the Cool Neighbors VII: Spectroscopy of faint, red NLTT dwarfs

I. Neill Reid¹

*Space Telescope Science Institute, 3700 San Martin Drive, Baltimore, MD 21218; and
Department of Physics and Astronomy, University of Pennsylvania, 209 South 33rd Street,
Philadelphia, PA 19104; inr@stsci.edu*

Kelle L. Cruz¹, Peter Allen¹, F. Mungall¹

*Department of Physics and Astronomy, University of Pennsylvania, 209 South 33rd Street,
Philadelphia, PA 19104; kelle@sas.upenn.edu*

D. Kilkenny

South African Astronomical Observatory, P.O. Box 9, Observatory 7935, South Africa

James Liebert¹

*Department of Astronomy and Steward Observatory, University of Arizona, Tucson, AZ 85721;
liebert@as.arizona.edu*

Suzanne L. Hawley, Oliver J. Fraser, Kevin R. Covey

Department of Astronomy, University of Washington, Box 351580, Seattle, WA 98195

Patrick Lowrance¹

IPAC, MS 100-22 Caltech, 770 S. Wilson Ave., Pasadena, CA 91125

ABSTRACT

We present low-resolution optical spectroscopy and BVRI photometry of 453 candidate nearby stars drawn from the NLTT proper motion catalogue. The stars were selected based on optical/near-infrared colours, derived by combining the NLTT photographic data with photometry from the 2MASS Second Incremental Data Release. Based on the derived photometric and spectroscopic parallaxes, we identify 111 stars as lying within 20 parsecs of the Sun, including 9 stars with formal distance estimates

¹Visiting Astronomer, Kitt Peak National Observatory, NOAO, which is operated by AURA under cooperative agreement with the NSF.

of less than 10 parsecs. A further 53 stars have distance estimates within 1σ of our 20-parsec limit. Almost all of those stars are additions to the nearby star census. In total, our NLTT-based survey has so far identified 496 stars likely to be within 20 parsecs, of which 195 are additions to nearby-star catalogues. Most of the newly-identified nearby stars have spectral types between M4 and M8.

Subject headings: stars: low-mass, brown dwarfs; stars: luminosity function, mass function; Galaxy: stellar content

1. Introduction

Recent years have seen renewed interest in the stellar populations in the immediate Solar Neighbourhood, stimulated in part by the discovery of significant numbers of extrasolar planetary systems. Understanding the frequency and distribution of those systems as a function of stellar properties is clearly fundamental in understanding the formation mechanism(s), and the nearest stars provide the best observational opportunities for studying such issues. A vital step in this process is compiling a reliable census of the local stars and brown dwarfs. The Hipparcos survey (ESA, 1997) provides accurate statistics for earlier type stars (spectral types A to K), albeit of limited completeness beyond $d \sim 30$ parsecs. However, catalogues of low-luminosity later-type dwarfs become woefully incomplete at distances of only 10 to 15 parsecs from the Sun (Reid, Gizis & Hawley, 2002 - PMSU4; Henry *et al.*, 2002), yet those systems make a substantial numerical contribution to the local stellar population.

As part of the NASA/NSF NStars initiative, we are currently undertaking a large-scale survey which aims to improve significantly the Solar Neighbourhood census of late-type dwarfs. With effective temperatures $T_{eff} < 4000\text{K}$, these stars and brown dwarfs emit the bulk of their radiative flux at near-infrared wavelengths. We are therefore using JHK_S photometry provided by the 2-Micron All Sky Survey (2MASS - Skrutskie *et al.*, 1997), both in isolation and in combination with other surveys, to search for previously unrecognised M and L dwarfs within 20 parsecs of the Sun.

Ultracool dwarfs (spectral types $\geq \text{M7}$) have distinctive (J-K_S) colours, and nearby candidates can be identified directly from the 2MASS photometry (as described by Cruz *et al.*, 2003, Paper V). Earlier type M dwarfs are less distinctive at near-infrared wavelengths, requiring that we supplement the 2MASS data. Proper motions have long proven an effective means of identifying nearby stars, particularly Luyten's Palomar Schmidt surveys. The most extensive such catalogue is the NLTT (Luyten, 1980), including over 58,000 stars with $\mu \geq 0.18'' \text{ yr}^{-1}$ (corresponding to a tangential velocity $V_{tan} > 19\text{km s}^{-1}$ at 20 parsecs). The NLTT does not extend to extremely faint magnitudes. Salim & Gould (2002) have undertaken a recent thorough analysis, and conclude that the catalogue becomes significantly incomplete at $m_r > 17$. However, the catalogue is more than adequate for

our purposes, since this limit corresponds to the apparent magnitude of an M7 dwarf at 20 parsecs. We therefore expect analysis of the NLTT catalogue to provide additional mid- to late-type M dwarfs (M3-M7) within 20 parsecs, complementing the ultracool dwarfs identified directly from the 2MASS photometry.

Our analysis is restricted to the $\sim 48\%$ of the sky covered by the 2MASS Second Incremental Release (Skrutskie *et al.*, 2000; hereinafter, 2M2nd). Paper I in this series (Reid & Cruz, 2002) described how we cross-referenced the NLTT catalogue against that database and identified over 23,000 proper motion stars with 2MASS counterparts within 10 arcseconds of the predicted position (J2000, epoch 1998.0). Using the (m_r-K_S) colours for those stars, where m_r is from the NLTT, we selected a sample of 1245 stars likely to be within 20 parsecs of the Sun. This sample is defined as NLTT Sample 1 (NLTT1)². As discussed further below, eight of those candidates have since been eliminated as spurious, reducing the total to 1237 stars. Four hundred and sixty-nine of the NLTT1 stars are known nearby dwarfs, with published photometric or spectroscopic data (as summarised in Paper I). Paper II (Reid, Kilkenney & Cruz, 2002) presented BVRI photometry for a further 180 stars, while Paper III (Cruz *et al.*, 2002) discussed optical spectroscopy of over 50 of the fainter candidates. We have continued to obtain follow-up observations of this sample, and this paper presents optical spectroscopy and photometry of 453 M dwarfs. With the addition of those data, we have distance estimates for 1126 stars from NLTT Sample 1, including all 378 stars with $m_r > 14.5$.

The paper is organised as follows: §2 reviews the target selection and describes the spectroscopic and photometric observations; §3 discusses the bandstrengths measured for the more prominent spectral features, and presents the derived spectral types and distance estimates; §4 discusses a number of the more interesting stars; and §5 summarises the overall results and our conclusions.

2. Spectroscopic and photometric observations

2.1. Target priorities: late-type dwarfs in the NLTT

Proper motion surveys are kinematically defined samples: the effective sampling volume is determined by the average tangential velocity, $\langle V_T \rangle$, of the particular stellar population surveyed. In the case of the Galactic disk, $\langle V_T \rangle \approx 37 \text{ km s}^{-1}$ (Reid, 1997), so the characteristic distance limit of stars in the NLTT catalogue ($\mu > 0.18'' \text{ yr}^{-1}$) is ~ 43 parsecs. All NLTT stars are drawn from the same volume, so stars at fainter apparent magnitudes generally also have fainter absolute magnitudes. The local stellar census is least complete for late-type dwarfs, and those low luminosity

²A subsequent paper in this series will discuss follow-up observations of two additional NLTT samples: NLTT2, compiled by searching for potential 2MASS counterparts within 60 arcseconds of predicted NLTT positions; and NLTT3, drawn from the rNLTT Salim & Gould (2002).

systems are the highest priority targets of our NStars survey. We have therefore concentrated our follow-up spectroscopic observations on the faintest stars in NLTT1.

In particular, we have targeted stars in NLTT1 with $m_r > 14.5$, corresponding to $M_r > 13$ or spectral types later than $\approx M3$ for distances $d < 20$ parsecs. As noted above, the initial sample defined in paper I included 1245 stars. More detailed scrutiny has shown that eight of those stars were paired with 2MASS data for other stars within the 10-arcsecond search radius. None of the eight NLTT dwarfs meet our $(m_r, (m_r - K_S))$ criteria when matched correctly (two are white dwarfs), reducing the total sample to 1237 stars, of which 378 have $m_r > 14.5$. Forty-four of the faint subset have published photometry and are included in Paper I, while a further 32 are discussed in Paper III (supplementary observations of fifteen stars from Paper III are presented here). Thirteen stars are either well-known late-type dwarfs or are sufficiently red at $(J - K_S)$ that they are included in the 2MASS-selected sample discussed in Paper V. Relevant properties of those stars are summarised in Table 1. Spectroscopic observations of the remaining 288 NLTT1 stars with $m_r > 14.5$ are presented in this paper together with data for a number of brighter stars.

Broadband photometric colours provide an alternative means of estimating distances and luminosities of late-type dwarfs and, as discussed in Paper II, we are using this technique for follow-up observations of many of the brighter stars ($m_r < 14.5$) in the NLTT 1 sample. We have continued our program of follow-up observations, and BVRI data for a further 96 stars are presented in this paper.

2.2. Spectroscopy

We have obtained low-resolution optical spectroscopy of 357 NLTT dwarfs, covering the 6000 to 10000 Å wavelength range. Astrometry and 2MASS/NLTT photometry for all targets are given in Table 2. The observations were obtained by a variety of observers at Kitt Peak National Observatory, Cerro Tololo Interamerican Observatory and Apache Point Observatory on the following occasions.

Cruz, Reid and Allen used the GoldCam spectrograph on the Kitt Peak 2.1m on 2001 November 1–5, 2002 July 2–7 and 2003 March 12–16. The weather was generally photometric with moderate seeing ($1''.5$). On each occasion, we employed the 400 line mm^{-1} grating, blazed at 8000Å, with an OG550 order-blocking filter. Observations were made using a $2''.0$ slit. The spectra have a resolution of 5.5Å. The Ford 3K×1K CCD used in this spectrograph produces significant fringing redward of $\sim 8200\text{Å}$. None of the more important spectral features discussed in this paper lie at those wavelengths, however.

Observations were also made by Cruz, Liebert, C. Cooper and N. Gorlova at Kitt Peak on 2001 July 13–23, using the RC spectrograph on the 4m Mayall telescope. An OG530 filter was employed as an order-blocking filter, and the 317 line mm^{-1} grating coupled with a $1''.5$ slitwidth gave a spectral resolution of 5.6Å (2 pixels). The weather was generally favourable throughout the run,

with partly cloudy conditions and a wide range of seeing conditions. Further observations using a similar instrumental setup (an OG550 order-blocking filter replaced the OC530) were made by Liebert and Lowrance on 2002 January 21–24. Seeing was better, with a $1''.0$ slit used on January 21, 22 and 24 (spectral resolution 4.7\AA), although the $1''.5$ slit was employed on January 23. Additional observations were obtained by Reid, Cruz, Liebert and Mungall using the Mayall telescope with the Multi-Aperture Red Spectrometer (MARS) on 2002 September 24–28 and 2003 July 8–13. The VG8050-450 grism was employed with a $2''$ slit, giving an resolution of 7\AA (3.5 pixels). High cirrus was present during most of the July 2003 observations.

A number of southern targets were observed on 2002 January 26–30 by Reid and Cruz using the RC spectrograph on the CTIO 1.5-metre. Cruz and Mungall obtained further observations with this telescope and spectrograph on 2003 May 14–17. Seeing was between $0''.7$ and $2''.0$ throughout both runs. We combined the 500 line mm^{-1} grating, blazed at 8000\AA , with a $1''.5$ slit-width to give spectra with a resolution of 6.5\AA (3 pixels). As with the 2.1-metre observations, the Loral 1K CCD is subject to significant fringing beyond $\sim 8000\text{\AA}$.

Finally, thirty stars were observed by Hawley, Fraser and Covey using the Double Imaging Spectrograph (DIS II) on the 3.5-metre telescope at Apache Point Observatory. Spectra were obtained on 10 April, 14 May and 30 May 2002. The medium resolution (300 line mm^{-1}) grating was employed on the red camera, giving a dispersion of 3.15 \AA pix^{-1} . Seeing was typically $1''.5$, and a $1''.5$ slitwidth was employed for these observations, giving a resolution of 7.3\AA (2 pixels).

All spectra were bias-subtracted, flat-fielded, corrected for bad pixels, extracted and wavelength- and flux-calibrated using the standard IRAF packages CCDPROC and DOSLIT. The wavelength calibration was determined from He-Ne-AR arcs taken at the start of each night. The flux calibration was determined using the standard stars HD 19445, HD 84937, Ross 640, G191-B2b, L1363-3, HZ 4 and Feige 34 (Oke & Gunn, 1983; Hamuy *et al.*, 1994). At least one flux standard was observed each night, and a comparison of repeated independently-calibrated observations of individual program stars indicates that the derived spectral energy distributions are consistent to better than 5% over the full wavelength range. This is more than adequate for the purposes of this program.

M dwarf spectra are dominated by molecular bands. We have measured bandstrengths for a number of those features using the techniques outlined in Paper III. The derived indices for TiO (7020\AA band), CaH (6300 and 6800\AA), CaOH (6250 \AA), VO (7300 \AA) and $\text{H}\alpha$ are listed in Table 3. Our measurements of the standard stars show excellent agreement with previously published data, with no systematic offset and typical dispersions of ± 0.01 . Moreover, ten stars from the present sample have independent observations listed in Table 5 of Paper III. Direct comparison with those measurements gives mean differences $|\Delta| < 0.01$ and rms dispersions of $\sigma < 0.02$.

2.3. Photometry

The photometric follow-up observations were obtained by D. Kilkenny between 2001 December and 2002 July, using the St. Andrews photometer on the 1 metre telescope at the Sutherland station of the South African Astronomical Observatory. The photometer is equipped with a Hamamatsu R943-02 GaAs photomultiplier, and observations were made using a Johnson-Cousins filter set. Most observations were made through a 21'' diameter aperture, with a 31'' aperture employed for conditions of poor seeing. The relatively large apertures lead to our photometry including contributions from other stars in a few cases, as noted below.

The observations were reduced using identical methods to those outlined in Paper II (see also Kilkenny *et al.*, 1998). In general, we obtained B-band data for only the brightest stars. The program star photometry was calibrated using observations of both E-region standards (Cousins, 1973; Menzies *et al.*, 1989) and redder standards from Kilkenny *et al.* Figure 1 shows the residuals in V, (B-V), (V-R) and (V-I) derived from our observations of the latter stars. In each case, the overall rms uncertainties are better than 1%. None of the NLTT stars discussed here have previous observations. However, Paper II presented an extensive comparison between SAAO and literature data for late-type dwarfs, demonstrating that our photometry is accurate and consistent with standard photometric systems to better than 1%. We note that the uncertainties in the derived photometric parallaxes are dominated by the intrinsic width of the main sequence, which leads to dispersions $\sigma = 0.25$ to 0.4 magnitudes in the mean calibrating relations (Paper I).

Table 4 presents the results of our photometry of the NLTT stars. In addition to the optical data, we have listed the positions and near-infrared photometry from the 2M2nd³ Table 4 gives the number of observations of each star and, in cases with multiple observations, the rms dispersion in the derived mean magnitudes and colours. Based on these results and past experience, we expect that the typical uncertainties in our VRI photometry are $< 2\%$, even for stars with single observations. A few stars show larger night-to-night residuals, primarily in magnitude rather than colour. We interpret these higher residuals as indications of variability at the < 0.1 magnitude level. The relevant stars are identified in Table 4.

3. Spectral types, distances and absolute magnitudes

Our primary goal is identifying late-type dwarfs which are likely to lie within 20 parsecs of the Sun. The spectroscopic and photometric data that we have obtained can provide distance estimates. However, it is important to bear in mind that the main sequence has a significant intrinsic width, while our distance estimates are calibrated against the mean properties of the local disk population. Trigonometric parallax measurements remain the most reliable method of distance determination

³Note that slight changes in both the astrometry and photometry of these objects may be present in the final 2MASS data release.

for individual stars, and eventually all of the nearby-star candidates identified in our project should be targetted by parallax programs.

3.1. Spectroscopic parallaxes

We expect that the majority of the stars in the NLTT1 sample are drawn from the disk population. The narrowband indices measured from our low-resolution spectra provide a means of checking that assumption. Cool metal-poor subdwarfs show enhanced CaH absorption relative to TiO absorption (Jones, 1973; Mould, 1976). Gizis (1997) has calibrated this behaviour using the same CaH indices which we have measured in this paper. Figure 2 compares the CaH2/TiO5 and CaH3/TiO5 distributions for the NLTT stars against reference data for disk dwarfs (from Reid *et al.*, 1995 - PMSU1) and intermediate and extreme subdwarfs (from Gizis, 1997). As discussed further below, all save one of the NLTT dwarfs have CaH/TiO strengths consistent with their being members of the disk population.

We have used the narrowband indices listed in Table 3 to derive spectral types and absolute magnitude estimates for the 357 stars with spectroscopic data. The spectral types are calibrated primarily using the TiO5 index, following the relation derived in Paper III. The 7020Å TiO band-head saturates at spectral type M6, leading to the breakdown of this calibration method, with TiO5 decreasing in strength at later types. Fortunately, the VO-a index provides an alternative means of calibrating spectral types earlier than M8 (there are no later type stars in the present sample). In general, the TiO5 and VO-a spectral type calibrations agree to better than a spectral class, so discordant classifications allow us to identify the few M6-M8 dwarfs in the present sample. The spectral classification of those stars rests on visual examination, as discussed in Paper V. Indeed, we have inspected all of the spectra and verified the classifications listed in Table 3. Thirteen of the fifteen stars from Paper III are included in Table 3, and the spectral types differ by less than 0.5 classes; in most cases, the two measurements are in exact agreement.

Narrowband indices also provide a means of estimating absolute magnitudes. We have employed the CaH2, CaOH and TiO5 indices for this purpose, utilising the calibrating relations defined in Paper III. As outlined in that paper, all three calibrations show the same morphology, with a clear discontinuity between upper and lower branches at $8 < M_J < 9$ (spectral type \approx M3). This feature appears at the same effective location in the main sequence in all colours (Paper I, Williams *et al.*, 2002). In Paper III we fitted separately the upper and lower branches of the colour-magnitude diagram (CMD) for each narrowband index. Since M_J is inherently ambiguous for stars falling in that region of the CMD, we have simply averaged the absolute magnitudes derived from the upper and lower calibrations for a particular index, and assign an uncertainty of ± 0.4 magnitudes.

Absolute magnitudes and uncertainties for stars with spectral types earlier than M6 are derived by averaging the three individual estimates (TiO5, CaH2 and CaOH). The uncertainties of ± 0.02 in the measured bandstrengths correspond to typical uncertainties of ± 0.14 in M_J , generally less

than the width of the main sequence over the range covered by this calibration. Both CaH2 and CaOH follow TiO5 in showing a reversal in behaviour at spectral type \approx M6. As a result, we cannot use these indices to estimate absolute magnitudes for later type dwarfs. Instead, we have estimated absolute magnitudes for those stars using the spectral-type/ M_J calibration defined in Paper V. The derived absolute magnitudes are listed in Table 2.

The one possible non-disk star is LP 381-49, which lies close to the sdM sequence in the (TiO5, CaH2) plane (at [0.32, 0.25]) and on the lower edge of the disk distribution in the (TiO5, CaH2) plane (at [0.32, 0.56]). Our spectrum of that star, obtained with the CTIO 1.5-metre, is compared to the spectral standards Gl 83.1 (M4.5) and Gl 65 (M5.5) are shown in Figure 3. The signal-to-noise in our spectrum is only moderate, but H α is clearly present in emission. If confirmed as an intermediate subdwarf, then the star is likely to be even closer than our current estimate of 14 parsecs.

3.2. Photometric parallaxes

We have followed the approach outlined in Papers I and II to estimate photometric parallaxes for the NLTT dwarfs with broadband photometry. As in those previous papers, we combine estimates based on three colour indices - (V-I), (V-K) and (I-J) - using the relations defined in Paper I. Broadband CMDs also show the discontinuity at \approx M3 evident in the narrowband CMDs, and the associated uncertainties in absolute magnitude increase accordingly. Elsewhere, typical uncertainties for an individual photometric parallax are between ± 0.25 and ± 0.35 magnitudes. Recognising the intrinsic dispersion in the main sequence, we set a lower limit of ± 0.25 mag on the uncertainty associated with the combined, mean absolute magnitude.

Our BVRI data are derived from aperture photometry, and, as noted in §2.2, in a few cases the aperture includes additional stars, either background field stars or genuine binary companions. The five stars affected by this problem are identified in Table 4, and we used images from 2MASS and the DSS to estimate the appropriate adjustments to the V magnitude (we assume that the optical colours are largely unaffected). In one case, G 274- 24 (or GJ 2022AC), the offending star, an equal-magnitude binary companion, is sufficiently close that 2MASS also fails to resolve the system. Jao *et al.*(2002) have used higher spatial-resolution imaging to determine the relative magnitudes of the components in this system, and we have adjusted both the optical and near-infrared data accordingly. The photometric parallaxes for these five systems are correspondingly less certain than those of the other NLTT stars.

Our final estimates of the absolute magnitudes and distances of the 96 NLTT dwarfs with BVRI observations are given in Table 4. Two stars have spectroscopic observations from Paper III: LP 768-113 and G 75-35. In the former case, our spectroscopic distance estimate is 17.5 parsecs, in exact agreement with the photometric estimate. G75-35, with spectral type M4, lies near the break in the main-sequence and we gave two distance estimates in Paper III - 11.2 ± 0.8 parsecs

and 17.3 ± 1.8 parsecs. The former is consistent with our current photometric estimate of 12.4 ± 1.8 parsecs. As with all stars with spectral types M3-M4, trigonometric parallax data are required for definitive distance measurements.

4. Discussion

4.1. Distances

The distance distributions of both spectroscopic and photometric samples are shown in Figure 4. Both show the same broad overall trend, with earlier-type/bluer stars lying at larger distances. This is as expected, since, in both cases, the targets are drawn primarily from a limited range of apparent magnitude - $14.5 < m_r < 18$ for the spectroscopic sample, and $11 < m_r < 14.5$ for the photometric sample. Lower luminosity stars in each sample are, of necessity, at smaller distances.

Of the stars included in this paper, over 100 have formal distance estimates of less than 20 parsecs. 36 of the 96 stars with BVRI photometry have mean photometric parallaxes $\pi_{ph} \geq 0''.05$; a further 16 have distance estimates within 1σ of our 20 parsec limit. Similarly, 75 of the 357 stars with spectroscopic parallaxes have inferred distances of less than 20 parsecs, while a further 37 lie within 1σ of the limit. Few, if any, of these stars have appeared in previous catalogues of the local stellar population, although we note that several are currently under study by the CTIOPI program (Henry *et al.*, 2002).

4.2. Stars of particular interest

The nearest stars: Four stars in the spectroscopic sample and five stars in the photometric sample have formal distance estimates of less than 10 parsecs. From the spectroscopic sample, these are:

LP 71-81 (d=7.1 pc, M4.5), LP 206-11 (7.8 pc, M6.5), LP 349-25 (8.5 pc, M7.5) and LP 30-55 (d=9.8 pc, M4.5);

from the photometric sample, LP 876-10 (7.2 pc, (V-I)=2.94, \sim M4.5), LP 984-92 (8.3 pc, (V-I)=3.00, \sim M4.5), LP 991-84 (8.3 pc, (V-I)=2.94, \sim M5), LP 869-26 (9.2 pc, (V-I)=3.19, \sim M4.5/M5) and LP 869-19 (9.8 pc, (V-I)=2.91, \sim M4.5).

Several of these stars lie close to the break in the disk main-sequence, where photometric and spectroscopic parallaxes are particularly uncertain. Nonetheless, all nine are high priority candidates for trigonometric parallax programs.

Strong H α stars: Many of the NLTT M dwarfs have detectable emission at H α , and the statistics for the full sample will be discussed by Liebert *et al.* (in prep.). However, several stars stand out as having particularly strong emission. These include LP 209-2 (EW=10.1Å), LP 222-65 (13.8Å), LP 349-25 (13.5Å), LP 373-35 (10.7Å), LP 423-31 (26.0Å; see also paper V);

LP 763-3 (11.9Å), LP 763-61 (11.4Å), LP 800-58 (12.9Å), LP 820-16 (12.2Å) and LP 833-4 (17.9Å). In addition, we re-observed the M9 dwarf LP 647-13 ($d \sim 10.5$ pc) in the course of our July 2001 KPNO observing run. Our original observations, from September 2000, shows prominent $H\alpha$ emission, equivalent width 10.2Å; the July 2001 observation has significantly stronger emission, $EW = 36.2\text{Å}$, suggesting that we happened to catch it during a flare. There is no evidence in our spectrum for emission due to helium or alkaline elements.

4.3. The nearby star census

With the addition of the observations described in this paper, we have quantitative distance estimates for 90% of the stars in the NLTT1 sample. Figure 5 shows the $(m_r, (m_r - K_S))$ and $(J - H)/(H - K_S)$ distributions for the 111 nearby-star candidates from that sample which still lack such data. All of those stars are brighter than $m_r = 14.5$ and have colours consistent with early- or mid-type M dwarfs. In addition to those stars, our nearby census must also include contributions from stars in the NLTT2 and NLTT3 samples. Nonetheless, we can undertake a preliminary assessment of the likely impact of our study on the statistics of local low-mass stars.

The current standard reference catalogue of nearby M dwarf is the third Catalogue of Nearby Stars (Gliese & Jahreiss, 1991: CNS3), supplemented by the extensive follow-up spectroscopy of the PMSU survey (PMSU1; Hawley, Gizis & Reid, 1996). This catalogue lists ~ 2150 M dwarfs, including 150 unresolved companions, most of which lie within 25 parsecs of the Sun. The distance limit for completeness, however, decreases sharply with increasing spectral type, with $d_{lim} = 14$ pc for M3/M4 dwarfs, $d_{lim} = 10$ pc for M5/M6 dwarfs and $d_{lim} = 5$ pc for ultracool dwarfs (PMSU4). We have cross-referenced the PMSU dataset against both the 2M2nd and the NLTT catalogue. Nine hundred and forty-eight of the 1966 resolved M dwarfs in the PMSU fall within the area covered by the former database, including 530 stars, from 476 systems, with PMSU distance estimates of less than 20 parsecs. We can match the statistics for that sample against the preliminary results from our NLTT-based survey.

First, the PMSU sample includes 96 stars which do not appear in the NLTT, although only 28 have formal distance estimates $d_{PMSU} < 20$ pc. Twenty-one of the latter 28 have spectral types earlier than M2. Most of the non-NLTT stars are drawn from objective prism surveys (e.g. Stephenson, 1986; Sanduleak, 1976; Robertson, 1984), and have proper motions below the NLTT limit. A few stars, however, have $\mu > 0.18'' \text{ yr}^{-1}$, but were not included in Luyten’s LHS catalogue. For example, amongst the $d_{PMSU} < 20$ pc stars, Vyssotsky 759 (1607+53) has $\mu = 0.23'' \text{ yr}^{-1}$, but is not listed in the NLTT.

We can use the PMSU stars included in the NLTT as a check on our $(m_r, (m_r - K_S))$ criteria, which are designed to select, with a comfortable margin, stars within 20 parsecs of the Sun. Four hundred and sixty-eight of the 502 $d_{PMSU} < 20$ pc. stars meet those criteria, as do 226 stars with $d_{PMSU} > 20$ pc (Figure 6). Thus, almost 90% of the 20-parsec PMSU stars are included in our

sample⁴. We will discuss the 34 ‘missing’ $d_{PMSU} < 20$ pc stars in more detail when we consider a complete analysis of the local luminosity function. For the moment, we note that most of the stars have spectral types of M3 or M4, and therefore lie near the break in the disk colour-magnitude relation (see Paper I).

Combining the results from Papers I-III with the current paper, we have identified 496 NLTT M dwarfs as likely to be within 20 parsecs of the Sun. One hundred and ninety-five of those stars are not included in the CNS3 and are additions to the local census, with most having spectral types later than M4. Figure 7 compares the J-band absolute magnitude distribution for the NLTT1 $d < 20$ parsec stars against the PMSU-2M2nd 20-parsec sample (511 stars). Even though the NLTT sample is still far from complete, it is clear that already we have more than doubled the number of known nearby dwarfs with $M_J > 9$ ($M_V > 13$, or spectral types later than M4). This is not surprising, given the limitations of the CNS3/PMSU dataset outlined above. These preliminary results indicate that our survey of NLTT stars offers the prospect of greatly improving the completeness of the local census of late-type dwarfs.

5. Summary

We have presented far-red spectroscopic observations and broadband BVRI photometry for 453 proper motion stars drawn from the NLTT catalogue. The stars were selected for observation based on their having a location in the $(m_r, (m_r - K_S))$ consistent with distances of less than 20 parsecs from the Sun. We have used narrowband spectroscopic indices, spectral types and broadband colours to derive spectroscopic and photometric parallaxes. Those more accurate distance estimates confirm that 111 lie within our sampling volume, while a further 53 have distances within 1σ of the formal distance limit. We expect that the completion of our NLTT survey will lead to a substantial increase in the number of known nearby late-type dwarfs and a corresponding increase in our knowledge of the properties of those objects. Combined with the ultracool dwarfs from the 2MASS survey described in Paper V, we anticipate obtaining a much improved, statistically-robust measurement of the luminosity function of Solar Neighbourhood late-M and L dwarfs.

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⁴Note that some of these stars are in the NLTT2 and NLTT3 samples.

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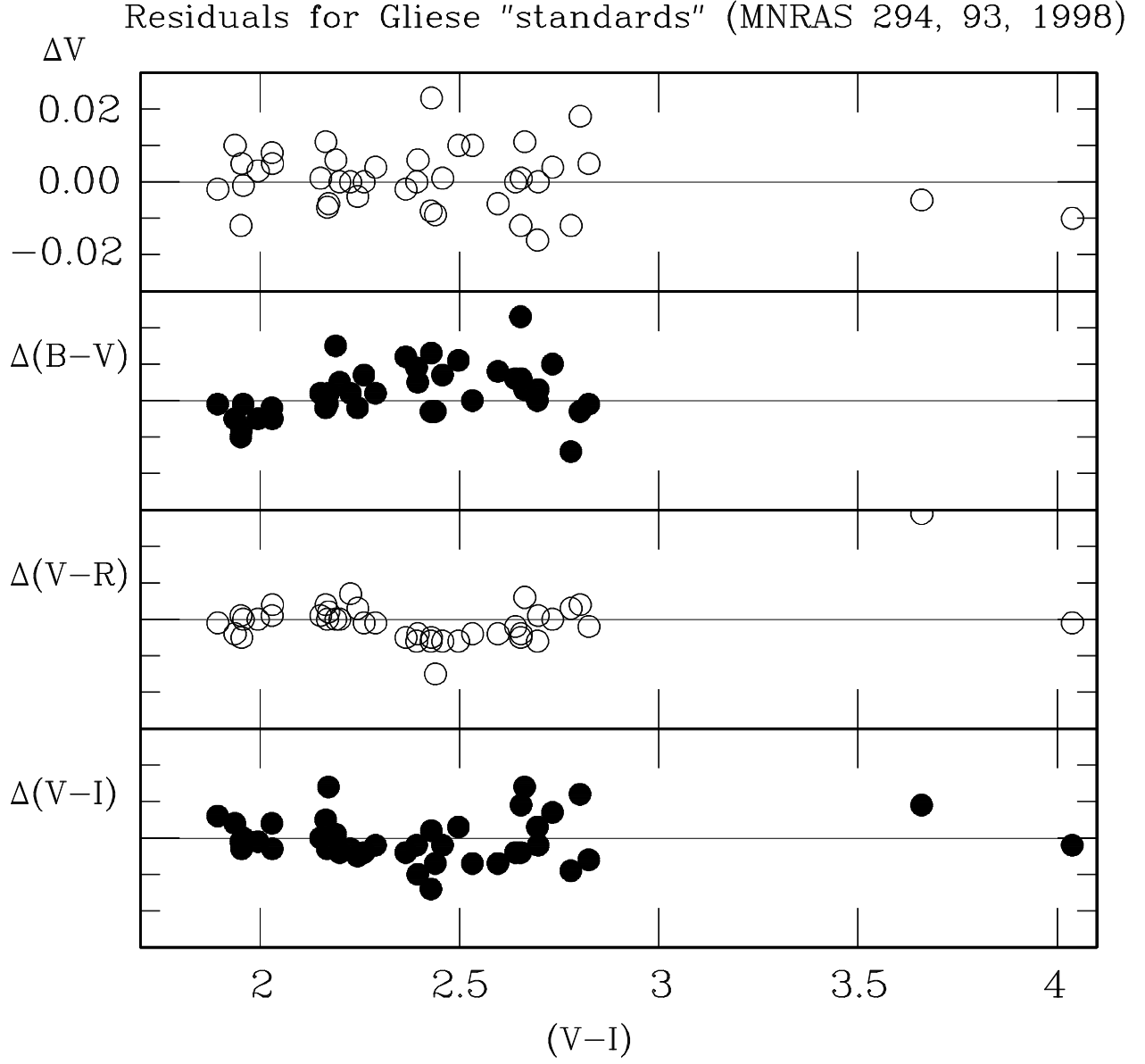


Fig. 1.— Photometric residuals for standard stars from the SAAO observations.

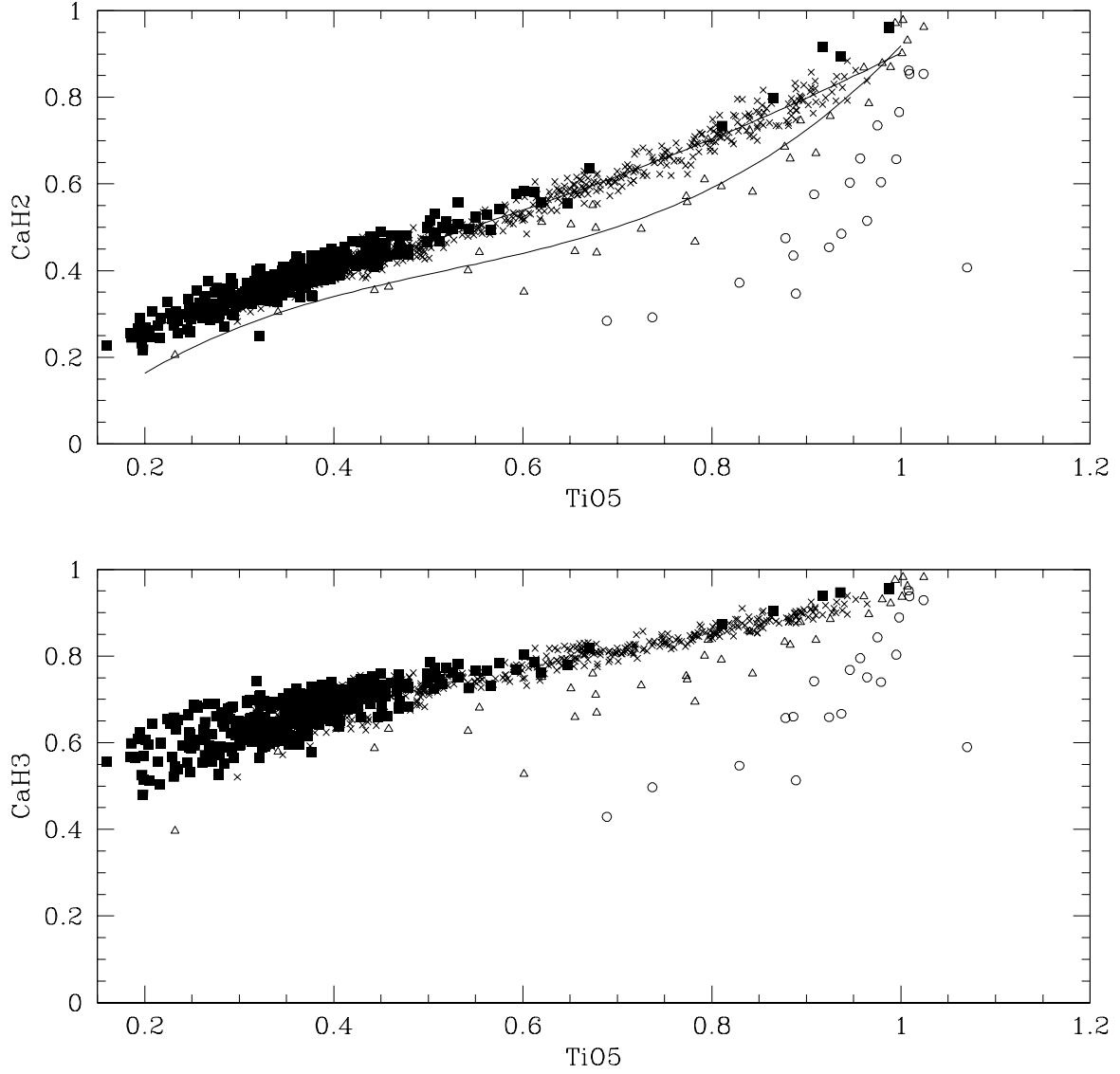


Fig. 2.— The TiO/CaH bandstrength measurements for the NLTT sample. The crosses plot reference data for disk dwarfs from the PMSU sample (PMSU1); the triangles and open circles plot data for intermediate and extreme subdwarfs (from Gizis, 1997). The solid lines in the upper diagram plot the mean relations for disk dwarfs and intermediate subdwarfs. Filled squares mark measurements of the NLTT1 stars listed in tables 2 and 3; apart from LP 381-49 (see text), all have bandstrengths consistent with near-solar abundance.

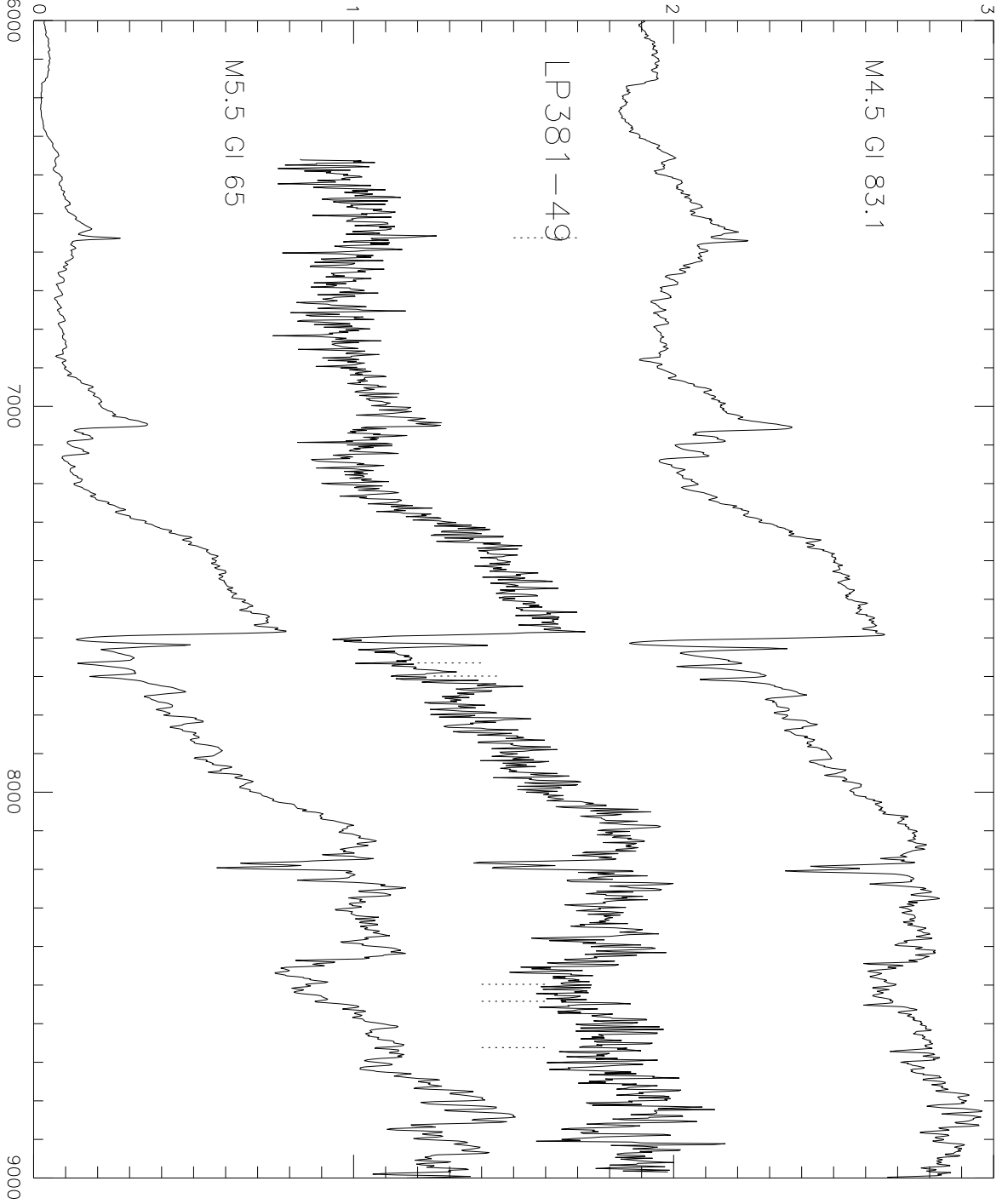


Fig. 3.— Our observations of LP 381-49, a candidate intermediate subdwarf, compared to the spectral standards Gl 83.1 and Gl 65. The dotted vertical lines marks the location of H α , KI and the Ca II triplet.

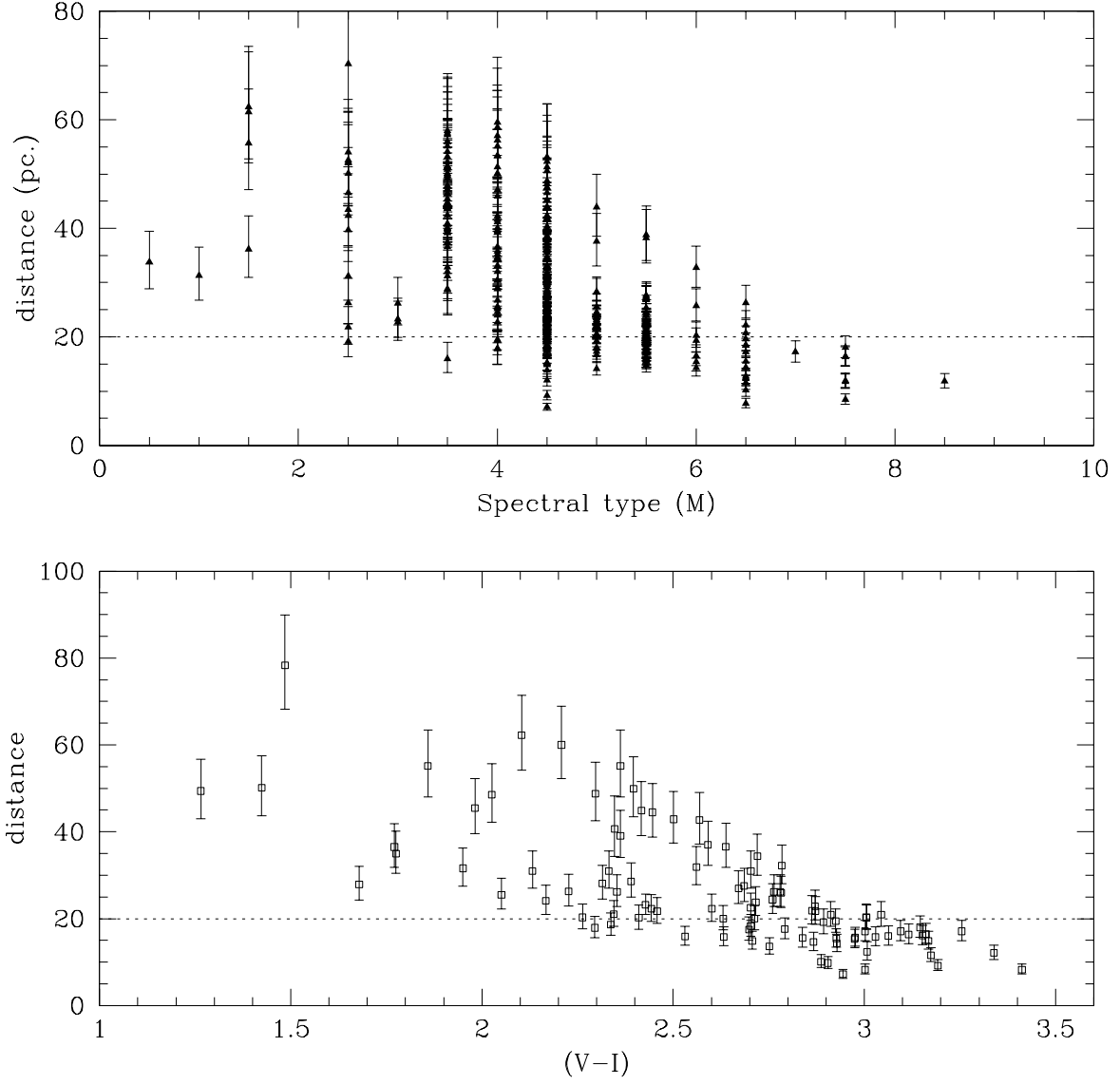


Fig. 4.— The distance distribution for the NLTT stars discussed in this paper. The upper diagram shows the distances deduced for stars with spectroscopic observations; the lower plots data for the 96 stars with BVRI data. The dotted line marks the formal distance limit for the present survey.

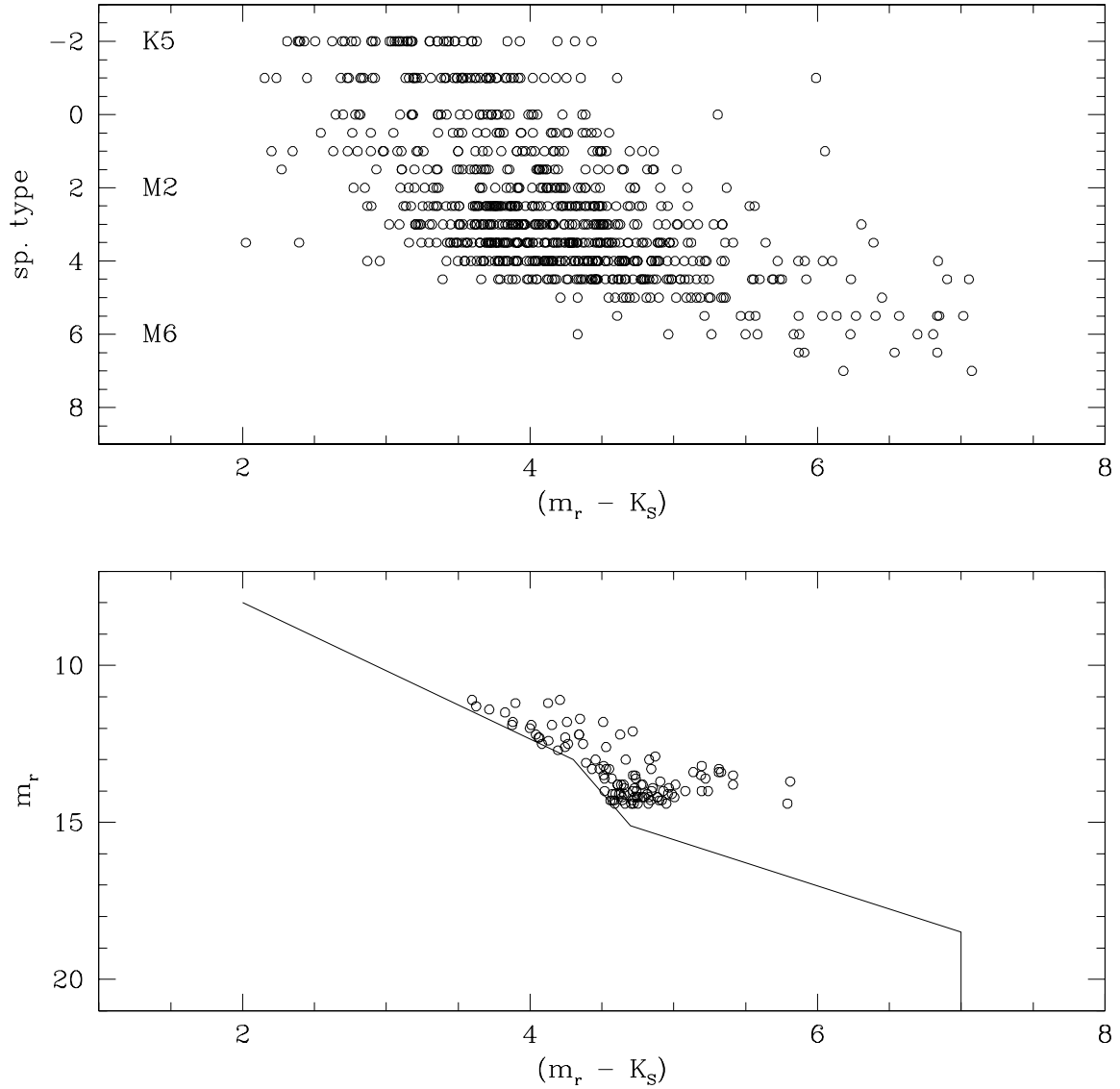


Fig. 5.— The upper panel shows the distribution of $(m_r - K_S)$ colours as a function of spectral type for PMSU stars within the area covered by the 2M2nd. The lower panel plots the $(m_r, (m_r - K_S))$ distribution for the 112 stars in the NLTT 1 sample which still lack accurate follow-up photometry or spectroscopy. The solid lines outline our colour-magnitude selection criteria.

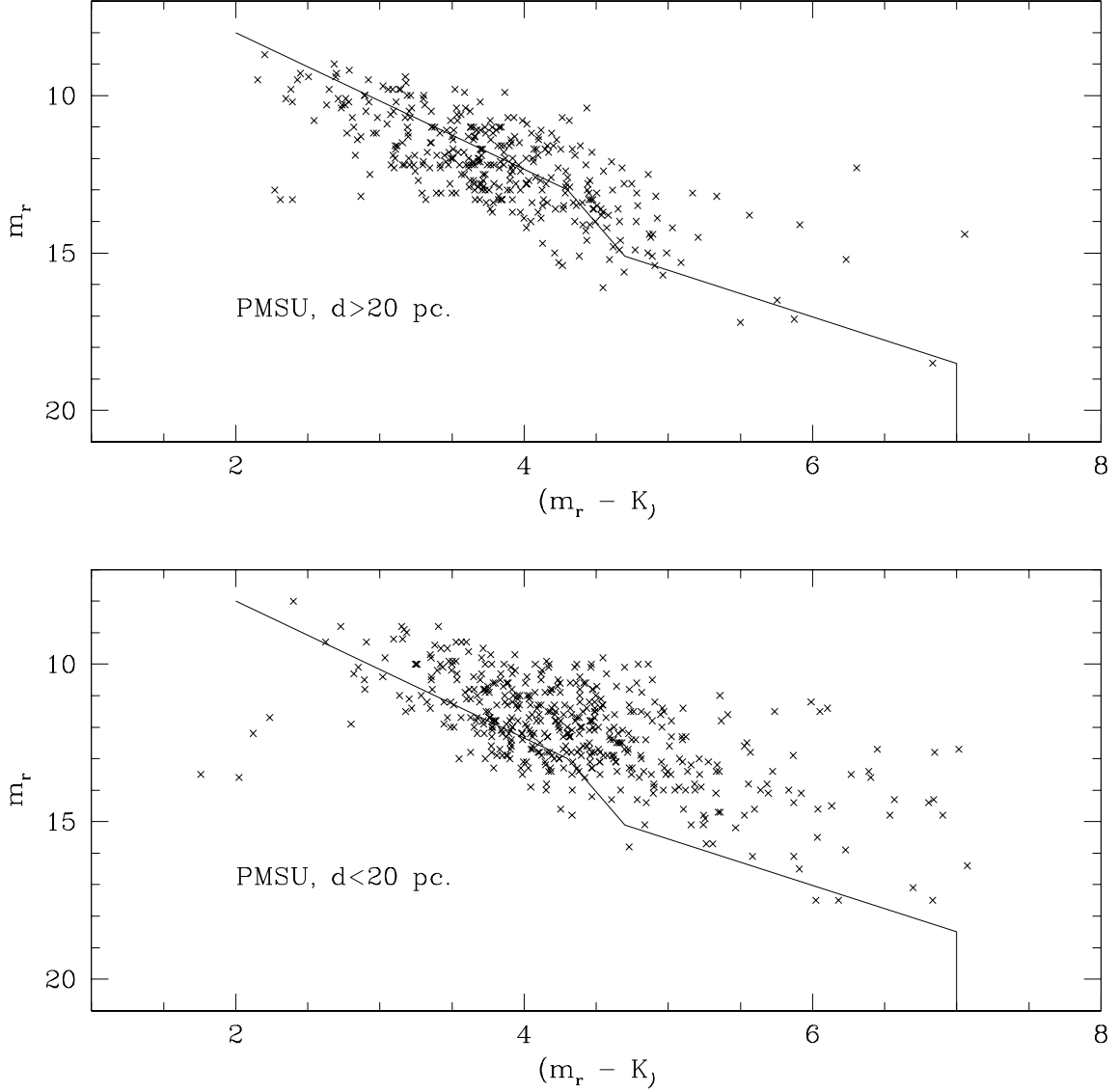


Fig. 6.— The $(m_r, (m_r - K_S))$ colour-magnitude diagrams for stars from the PMSU 2M2nd dataset which are also catalogued in the NLTT. The upper panel plots data for stars with distance estimates, from PMSU, which exceed 20 parsecs; the lower panel plots data for stars within our 20-parsec limit. In both cases, the solid lines mark the selection criteria adopted in paper I to construct the NLTT1 sample.

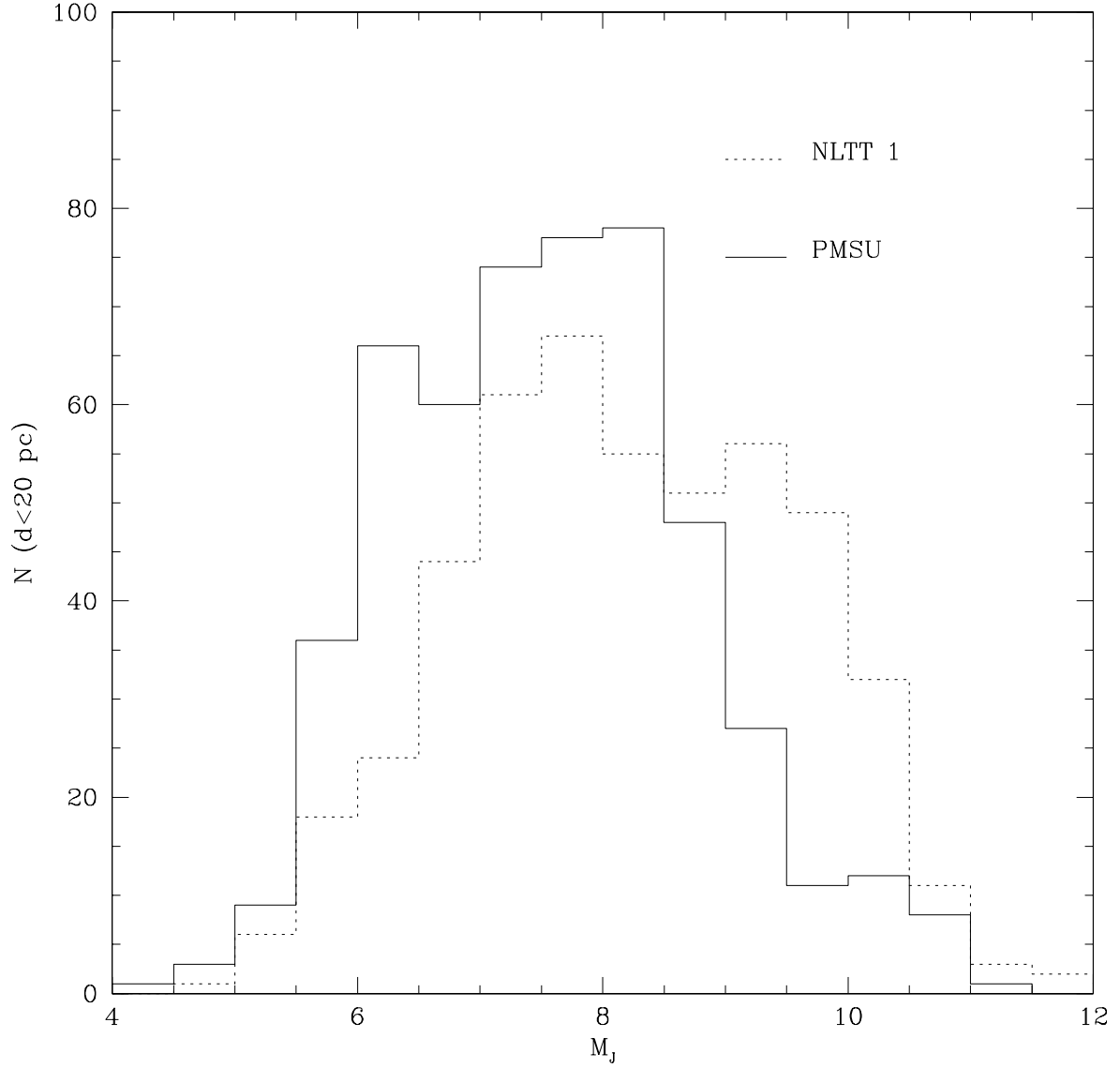


Fig. 7.— Additions to the nearby star census: the solid line plots the the M_J distribution for PMSU stars in the region covered by the 2M2nd dataset with distances (from PMSU) $d < 20$ pc; the dotted line plots the same distribution for stars with $d < 20$ -pc stars from the NLTT1 sample. It is clear that the NLTT1 sample is contributing significant numbers of additional late-type M dwarfs to the current census.

Table 1. Ultracool NLTT1 dwarfs in Paper V

name	α (2000)	δ	m_r	J	H	K_S	d	M_J	Notes
LP 649-93	02:18:57.8	-06:17:49	19.2	12.920	12.186	11.860	36.6 ± 5.0	10.10	M6, 1
LP 944-20	03:39:35.2	-35:25:44	17.5	10.748	10.017	9.525	5.0 ± 0.1	12.25	M9.5, 2
BD+34:1378B	06:32:02.0	34:31:13	14.7	10.694	10.132	9.876	29.4 ± 1.4	8.35	3
LP 423-14	07:41:06.8	17:38:45	18.1	11.995	11.362	10.969	17.9 ± 2.1	10.70	M7, 1
LHS 2090	09:00:23.5	21:50:05	15.5	9.423	8.856	8.429	6.1 ± 0.7	10.50	M6.5, 4
LHS 2243	10:16:34.7	27:51:49	17.4	11.951	11.294	10.946	14.1 ± 1.7	11.20	M8, 5
LP 213-67	10:47:12.6	40:26:43	16.3	11.417	10.777	10.400	15.4 ± 1.7	10.50	M6.5, 6
LP 213-68	10:47:13.8	40:26:49	18.7	12.445	11.705	11.277	17.7 ± 2.1	11.20	M8, 6
CE 440-319	12:03:28.0	-29:22:59	15.0	10.735	10.112	9.800	14.1 ± 2.1	9.95	M5.5, 7
LP 267-299	12:52:17.0	33:57:39	18.1	12.246	11.601	11.239	36.4 ± 3.7	9.40	M5.5, 1
LP 218-8	12:53:12.4	40:34:03	17.5	12.177	11.557	11.173	17.5 ± 1.7	11.00	M7.5, 1
LP 740-20	14:31:15.6	-13:18:24	16.1	11.136	10.496	10.121	23.9 ± 3.0	9.20	M5, 1
LP 695-351	20:41:41.0	-03:33:53	19.0	12.528	11.882	11.504	30.3 ± 5.2	10.10	M6, 1

Note. — JHK_S from 2MASS, m_r from the NLTT

1. Sp. type from Paper V, distance from sp. type./ M_J relation.
2. Brown dwarf, distance based on trigonometric parallax (Tinney, 1996).
3. HD 257728B/G103-36B; Hipparcos parallax for primary.
4. Scholz *et al.*(2001), distance from sp. type./ M_J relation.
5. Kirkpatrick *et al.*(1995), distance from sp. type./ M_J relation.
6. Gizis *et al.*(2000a), distance from sp. type./ M_J relation.
7. Ruiz & Takamiya (1995), distance from sp. type./ M_J relation. Henry *et al.*(2002) estimate sp. type M4.5 and a distance of 20 pc.

Table 2. Astrometry and photometry of spectroscopic targets

name	α (2000)	δ	m_r	J	H	K_S	M_J	d (pc.)	Notes
LP 824-354	0: 5:29.8	-25:31: 0.	14.4	10.308	9.675	9.370	6.87	48.7 \pm 7.4	
LP 824-355	0: 5:30.1	-25:31: 6.	13.2	9.435	8.773	8.459	6.65	36.0 \pm 5.5	
LP 191-43**	00:08:55.1	49:18:56	15.5	10.849	10.329	9.968	9.86	15.8 \pm 1.3	
LP 644-53	00:09:59.8	-6:32:01	15.3	11.175	10.592	10.293	8.47	34.8 \pm 5.8	
LP 880-607	00:11:58.9	-29:32:50	15.2	11.084	10.540	10.211	7.53	51.3 \pm 7.4	G267-49
LP 149-35	00:12:57.1	50:59:17	15.8	11.385	10.804	10.487	9.44	24.5 \pm 2.1	
LP 880-754	00:15:02.3	-27:02:44	14.5	10.688	10.069	9.828	6.75	61.4 \pm 9.4	cpm G266-75
LP 824-286	00:17:32.6	-24:31:06	15.1	11.237	10.583	10.318	8.23	39.9 \pm 6.7	
LP 645-4	00:20:10.6	-5:43:45	16.1	11.459	11.044	10.579	9.42	25.6 \pm 2.1	
LP 585-20	00:24:53.5	-1:47:09	15.0	10.983	10.392	10.182	7.58	47.9 \pm 7.3	
LP 193-488	00:26:02.5	39:47:23	15.2	11.013	10.435	10.110	8.57	30.8 \pm 5.2	
LP 585-28	00:27:10.0	-1:13:28	15.6	11.288	10.686	10.441	7.55	56.0 \pm 7.9	
LP 349-25**	00:27:55.9	22:19:32	17.0	10.608	9.970	9.561	11.1	7.7 \pm 0.8	Note 1
LP 150-13	00:30:12.4	50:28:39	15.0	11.059	10.441	10.147	8.29	35.8 \pm 6.0	
LP 585-49	00:34:06.0	-1:16:45	15.0	10.557	9.989	9.706	8.24	29.0 \pm 4.9	
LP 585-48	00:34:04.2	-1:19:58	15.6	11.359	10.759	10.498	7.58	57.0 \pm 8.0	
LP 765-49	00:36:21.6	-14:49:12	14.7	10.902	10.401	10.061	8.52	30.0 \pm 5.0	
LP 585-58	00:36:30.1	-00:54:40	15.3	10.992	10.415	10.127	9.27	22.1 \pm 1.9	
G 268-11	00:37:18.1	-20:00:35	14.9	10.630	10.030	9.762	7.61	40.1 \pm 5.8	
LP 705-93	00:43:39.3	-11:26:08	15.6	11.253	10.658	10.332	9.22	25.5 \pm 2.2	
G 132-25**	00:45:56.6	33:47:11	14.6	10.159	9.634	9.306	9.41	14.1 \pm 1.2	G 132-25
LP 406-35	00:54:53.5	17:44:57	15.0	11.080	10.501	10.183	9.15	24.3 \pm 2.0	
LP 646-49	01:00:14.0	-7:31:04	15.1	11.298	10.714	10.379	8.44	37.3 \pm 6.3	
LP 406-58	01:03:13.0	15:56:17	14.7	10.744	10.202	9.920	8.45	28.8 \pm 4.8	
LP 938-91	01:05:52.4	-34:34:48	15.2	11.169	10.609	10.261	7.53	53.4 \pm 9.0	LHS 1192
LP 647-13**	01:09:51.1	-3:43:26	17.9	11.695	10.921	10.418	11.56	10.6 \pm 1.1	Note 2
LP 707-17	01:10:30.2	-11:26:43	14.6	10.737	10.145	9.855	8.48	28.2 \pm 4.8	G 270-165
LP 467-17	01:12:00.0	15:02:17	16.9	11.928	11.321	10.965	8.98	38.8 \pm 4.7	Note 2
LP 938-144	01:14:36.6	-34:34:51	15.1	10.954	10.367	10.067	9.17	22.8 \pm 1.9	
LP 938-149*	01:15:29.8	-33:25:52	14.9	10.958	10.371	10.055	9.38	20.7 \pm 1.8	
LP 194-43	01:15:14.8	41:43:05	15.2	11.087	10.522	10.227	8.41	34.3 \pm 5.8	
LP 991-15	01:23:41.8	-38:33:49	14.6	10.655	10.098	9.749	8.54	26.5 \pm 4.5	
LP 243-18	01:27:05.2	37:54:15	14.8	10.861	10.259	10.022	8.26	33.1 \pm 5.6	
LDS3284B	1:28:12.6	16:14:28.0	14.6	10.721	10.082	9.859	7.13	52.2 \pm 8.0	
G 172-56	01:29:12.5	48:19:35	14.9	10.917	10.306	10.026	7.70	44.0 \pm 7.4	
G 133-25	01:39:44.1	38:27:54	15.0	11.091	10.490	10.196	7.68	48.2 \pm 6.8	
LP 296-11*	01:41:15.6	30:16:11	15.3	11.137	10.567	10.296	9.44	21.8 \pm 1.8	LHS 1280
LP 940-20	01:49:42.6	-33:19:20	14.7	10.923	10.309	9.999	8.44	31.4 \pm 5.3	Note 3
G 94-16	01:49:01.5	25:12:18	15.1	10.664	10.078	9.776	8.63	25.5 \pm 4.3	
LP 884-94**	01:51:05.1	-30:57:57	15.2	10.923	10.415	10.128	9.51	19.2 \pm 1.7	
LP 196-17**	01:58:45.1	40:49:44	14.7	10.723	10.072	9.833	9.28	19.5 \pm 1.7	
G 3-31	01:59:22.4	13:36:42	14.6	10.543	10.007	9.713	7.57	39.3 \pm 6.2	
LP 30-55**	02:01:54.0	73:32:32	14.1	9.252	8.669	8.382	9.42	9.2 \pm 0.8	Notes 2, 4
LP 589-25	02:03:41.7	-1:28:47	15.9	11.414	10.882	10.531	9.64	22.6 \pm 1.9	
G 4-5	02:12:20.0	12:49:28	14.7	10.814	10.126	9.878	7.33	49.7 \pm 7.8	
LP 769-58**	02:13:08.0	-19:01:52	15.0	10.765	10.229	9.931	9.42	18.6 \pm 1.6	LHS 1359
LP 829-41**	02:16:21.4	-22:00:48	16.0	11.277	10.761	10.373	9.85	19.3 \pm 1.6	
G 134-30**	02:22:14.5	45:42:01	14.5	9.860	9.319	9.046	8.41	19.5 \pm 3.3	
G 36-14	02:23:16.0	29:13:29	15.0	11.072	10.461	10.170	8.48	33.0 \pm 5.6	

Table 2—Continued

name	α (2000)	δ	m_r	J	H	K_S	M_J	d (pc.)	Notes
LP 770-16	02:24:30.6	-17:16:41	16.0	11.502	10.976	10.635	9.73	22.6 \pm 1.9	LHS 1401
LP 650-181	02:32:19.9	-6:02:30	14.9	10.434	9.787	9.582	6.71	55.7 \pm 8.5	
LP 298-43	02:52:43.4	33:22:35	15.3	11.272	10.713	10.453	8.48	36.2 \pm 6.1	
LP 134-63**	02:59:46.3	38:55:36	14.6	10.460	9.785	9.517	9.25	17.4 \pm 1.5	
G 37-23	03:01:33.0	32:51:22	15.1	10.844	10.235	9.947	7.56	45.3 \pm 6.4	
LP 246-43	03:01:48.3	37:33:20	15.2	11.317	10.678	10.426	8.32	39.8 \pm 6.7	
LP 198-649	03:22:04.5	39:26:03	14.7	10.545	9.945	9.780	7.05	50.1 \pm 7.6	
LP 356-158	03:31:35.7	24:55:38	14.9	10.673	9.997	9.801	7.39	45.4 \pm 7.1	
LP 31-200	03:43:43.2	72:53:49	15.0	10.578	10.000	9.734	8.28	28.9 \pm 4.8	G 221-20
G 160-17	03:43:04.4	-6:14:56.0	15.3	11.169	10.719	10.397	8.41	35.6 \pm 4.2	LHS 5079
LP 473-26	03:46:59.5	15:24:17	15.0	10.721	10.151	9.793	8.47	28.2 \pm 4.7	
LP 833-4	03:46:55.4	-22:54:14	15.3	11.010	10.440	10.131	8.44	32.7 \pm 5.5	LHS 1592
LP 773-43	03:50:32.0	-15:24:17	14.9	11.014	10.401	10.083	8.52	31.5 \pm 5.3	
LP 301-8	03:53:36.7	31:12:24	14.7	10.418	9.840	9.562	8.43	25.0 \pm 4.2	Note 5
LP 3-243	03:57:40.4	81:55:25	14.8	10.514	9.959	9.698	8.38	26.7 \pm 4.5	G 265-21
LP 301-14	03:57:41.0	28:27:19	15.4	11.210	10.547	10.229	8.24	39.2 \pm 6.6	
LP 31-433**	04:08:23.7	69:10:59	14.7	10.280	9.765	9.492	9.38	15.1 \pm 1.3	G 247-12
LP 833-49	04:10:41.3	-26:17:41	14.5	10.672	10.143	9.819	7.66	40.0 \pm 6.3	
LP 357-219	04:14:21.6	21:26:50	15.4	11.193	10.561	10.388	5.48	138.6 \pm 21.2	HG 8-13?
G 38-27	04:16:16.2	27:23:53	15.3	11.120	10.512	10.263	7.57	51.3 \pm 7.2	
LP 655-3	04:19:47.8	-5:08:35	16.2	11.732	11.078	10.760	9.58	26.9 \pm 2.3	
LP 775-20	04:27:05.0	-14:51:22	15.1	11.252	10.617	10.370	7.45	57.5 \pm 8.8	
LP 595-21	04:32:55.5	00:06:34	15.0	10.331	9.772	9.448	8.32	25.2 \pm 4.2	G 82-28, cpm G82-29
LP 415-217**	04:34:37.8	19:06:05	15.3	10.615	10.039	9.683	9.46	17.0 \pm 1.4	
LP 415-213	04:34:23.8	20:52:58	15.4	11.032	10.433	10.162	7.51	50.6 \pm 8.5	
G 8-53*	04:42:26.5	20:12:31	15.2	10.917	10.387	10.144	9.26	21.4 \pm 1.9	
LP 891-13	04:45:20.5	-27:26:01	15.1	10.971	10.389	10.110	7.38	52.3 \pm 8.8	Note 6
G 656-8	04:46:17.6	-6:23:00	15.5	11.025	10.495	10.246	8.51	31.8 \pm 5.4	
LP 835-18**	04:48:00.9	-26:03:01	14.9	10.770	10.244	9.963	9.31	19.6 \pm 1.7	
G 84-25*	04:57:58.6	-5:06:16	14.5	10.159	9.603	9.303	8.38	22.7 \pm 3.8	
LP 777-2*	05:07:42.9	-15:06:30	15.8	11.095	10.514	10.134	9.51	20.8 \pm 1.8	
LP 15-315**	05:08:18.4	75:38:15	14.6	9.444	8.858	8.552	8.59	14.8 \pm 2.5	G 248-32
G 85-42	05:08:35.4	20:25:26	14.9	10.958	10.501	10.235	9.21	22.3 \pm 2.0	
LP 717-4	05:09:32.9	-9:20:12	14.8	10.887	10.324	10.079	7.28	52.6 \pm 8.0	
LP 717-3*	05:09:19.3	-13:48:40	16.0	10.942	10.330	10.029	9.41	20.2 \pm 1.7	
LP 892-9	05:10:11.0	-29:26:59	15.2	11.130	10.609	10.346	7.57	51.5 \pm 7.5	
LP 892-32**	05:18:36.6	-28:42:06	16.0	10.880	10.333	10.001	9.58	18.2 \pm 1.5	
LP 892-36	05:19:55.0	-28:17:51	16.1	11.383	10.821	10.562	9.32	25.8 \pm 2.3	
LP 717-33	05:24:23.0	-14:04:38	15.1	11.008	10.438	10.178	7.48	50.8 \pm 7.8	
LP 718-5**	05:35:21.2	-9:31:06	17.5	11.851	11.201	10.814	10.44	19.4 \pm 1.9	
LP 658-106	05:37:23.3	-8:16:05	18.2	12.305	11.675	11.304	10.15	27.0 \pm 2.8	
LP 120-4	05:38:12.1	52:16:04	15.4	11.302	10.651	10.341	9.31	25.0 \pm 2.2	
LP 837-20	05:44:57.9	-24:56:09	14.6	10.787	10.143	9.875	8.50	28.7 \pm 4.8	
LP 659-6	05:58:50.2	-3:08:31	16.0	11.436	10.873	10.602	8.66	36.0 \pm 6.0	
LP 719-10**	06:02:54.2	-9:15:03	16.1	10.998	10.405	10.033	9.77	17.6 \pm 1.5	LHS 1810, Note 7
LP 120-46*	06:13:10.8	53:17:54	15.4	11.166	10.595	10.245	9.48	21.8 \pm 1.8	
LP 160-22**	06:23:51.2	45:40:05	14.7	10.361	9.778	9.467	9.27	16.5 \pm 1.4	
G 103-47	06:40:11.4	34:48:36	14.5	10.466	9.868	9.660	7.50	39.1 \pm 6.0	
G 251-15	06:46:33.8	79:11:50	14.7	10.581	10.061	9.773	8.53	25.7 \pm 4.3	

Table 2—Continued

name	α (2000)	δ	m_r	J	H	K_S	M_J	d (pc.)	Notes
LP 839-29**	06:46:41.0	-21:50:15	15.6	11.186	10.682	10.318	10.15	16.1 \pm 1.7	
G 103-64	06:49:22.1	32:09:55	14.6	10.785	10.141	9.870	7.65	42.3 \pm 6.0	
LP 16-342	06:50:28.0	75:11:10	15.3	11.076	10.499	10.258	7.58	50.1 \pm 7.1	G 251-17
LP 206-11**	07:11:11.3	43:29:59	15.1	9.965	9.461	9.137	10.44	8.0 \pm 0.8	LHS 1901
LP 482-43	07:29:22.2	12:07:02	14.8	10.987	10.385	10.081	7.68	45.9 \pm 6.5	
LP 256-34	07:35:54.6	33:33:46	15.3	11.304	10.714	10.412	9.39	24.1 \pm 2.0	
LP 483-33	07:45:29.5	11:59:46	15.0	10.692	10.180	9.896	7.47	44.1 \pm 6.7	
LP 17-78	07:49:26.9	77:52:42	14.7	10.472	9.861	9.617	7.65	36.7 \pm 5.2	G 251-46
LP 423-31**	07:52:23.9	16:12:15	16.3	10.831	10.192	9.819	10.70	10.6 \pm 1.1	Note 17
LP 310-28	08:04:48.1	31:06:20	14.6	10.738	10.123	9.878	7.69	40.7 \pm 6.8	
G 40-11*	08:12:18.6	21:58:47	14.7	10.253	9.688	9.411	8.35	24.0 \pm 4.0	G 40-11
LP 209-4	08:24:58.9	41:47:25	14.5	10.750	10.185	9.869	7.65	41.6 \pm 5.9	
LP 209-2*	08:24:30.9	39:00:53	16.0	11.100	10.511	10.126	9.53	20.6 \pm 1.7	
LP 665-6*	08:24:52.4	-3:41:01	16.5	11.589	10.990	10.626	10.04	20.4 \pm 1.7	
LP 785-4	08:24:29.3	-19:37:36	16.8	11.896	11.312	10.905	8.98	38.2 \pm 4.6	
LP 844-4	08:37:33.9	-22:32:31	14.6	10.508	9.933	9.614	8.39	26.6 \pm 4.5	
LP 726-12	8:48:36.9	-13:53:08.	13.6	9.590	8.944	8.686	7.12	31.2 \pm 4.5	
LP 209-59**	08:49:08.7	39:36:27	15.0	10.543	10.017	9.656	9.60	15.5 \pm 1.3	LHS 2052
LP 164-63	08:51:17.6	46:06:02	16.0	11.377	10.792	10.546	9.65	22.2 \pm 1.9	
LP 209-68*	08:56:30.3	43:36:03	14.9	10.907	10.403	10.086	9.35	20.5 \pm 1.7	LHS 2074
LP 844-33**	08:56:17.6	-23:26:57	15.5	10.712	10.129	9.834	9.45	17.9 \pm 1.5	
LP 312-51 **	08:59:29.3	29:18:18	15.2	10.796	10.185	9.898	9.59	17.4 \pm 1.5	
LP 726-36	09:02:31.0	-10:34:34	14.6	10.616	10.030	9.825	7.60	40.1 \pm 6.3	
LP 726-37**	09:04:40.1	-12:19:11	15.5	10.672	10.171	9.866	9.39	18.0 \pm 1.5	LHS 2098
LP 426-56	9:05:42.9	18:36:34.	12.0	8.990	8.357	8.098	6.89	26.3 \pm 3.8	
LP 427-16**	9:14:03.1	19:40:05.	11.3	8.418	7.806	7.505	7.01	19.1 \pm 2.8	
G 195-21	09:17:27.2	56:01:17	14.9	10.869	10.277	10.023	8.61	28.3 \pm 4.8	
LP 787-17	09:17:59.4	-18:23:27	15.8	11.469	10.861	10.531	9.52	24.5 \pm 2.1	
LP 313-38	09:18:41.4	26:45:52	15.8	11.249	10.635	10.268	9.38	23.6 \pm 2.0	cpm G47-33
LP 210-74	09:21:09.1	41:53:43	16.4	11.022	10.365	10.251	7.68	46.5 \pm 7.1	G 115-70
LP 787-32**	09:22:46.2	-15:47:23	15.8	10.973	10.436	10.081	9.47	20.0 \pm 1.7	LHS 2132
LP 787-45	09:28:14.7	-21:01:43	14.9	10.875	10.365	10.058	7.68	43.6 \pm 6.1	
LP 728-2	09:32:34.9	-10:51:40	15.7	11.242	10.728	10.454	8.36	37.7 \pm 6.3	
G 161-47	09:33:40.7	-10:03:16	14.9	11.067	10.588	10.218	7.58	49.8 \pm 7.4	
LP 428-13	09:35:15.0	15:20:46	16.9	11.820	11.242	10.962	9.26	32.6 \pm 2.9	
LP 260-39	09:36:34.3	35:14:10	15.1	11.211	10.617	10.294	7.50	55.1 \pm 8.7	
LP 36-234	09:36:38.4	73:05:29	15.2	10.558	10.020	9.744	7.57	39.6 \pm 5.6	G 252-40
LP 314-44*	09:39:23.3	29:43:27	17.6	11.985	11.401	11.083	10.44	20.4 \pm 2.1	
LP 788-26	09:43:37.7	-16:48:40	15.3	11.306	10.717	10.414	7.68	53.1 \pm 8.3	
LP 728-23**	09:46:27.7	-12:28:59	16.8	11.257	10.731	10.344	9.82	19.3 \pm 1.6	
LP 788-48	09:51:09.3	-16:35:18	14.7	10.857	10.299	9.990	8.33	32.0 \pm 5.4	
LP 728-42	09:55:23.7	-13:35:21	15.1	11.295	10.655	10.361	7.48	58.0 \pm 8.9	
LP 37-33	09:56:29.4	69:31:50	14.6	10.775	10.221	9.955	7.11	54.0 \pm 8.3	G 252-46
LP 729-7	09:57:06.6	-10:42:10	15.2	11.134	10.654	10.346	7.59	51.2 \pm 7.4	
LP 429-12	09:59:56.0	20:02:34	18.1	12.244	11.615	11.196	10.44	22.9 \pm 2.4	LHS 2215, Note 8
LP 789-23**	10:06:31.9	-16:53:26	17.6	12.041	11.421	11.000	10.94	16.4 \pm 1.7	
LP 729-33**	10:08:01.1	-14:36:26	14.9	10.625	10.045	9.646	9.40	17.6 \pm 1.5	
LP 167-17**	10:13:20.9	46:47:26	15.7	10.872	10.296	9.945	9.80	16.4 \pm 1.4	
G 54-18*	10:13:00.2	23:20:50.	12.6	9.176	8.623	8.391	7.56	21.0 \pm 3.0	

Table 2—Continued

name	α (2000)	δ	m_r	J	H	K_S	M_J	d (pc.)	Notes
G 54-19**	10:14:53.1	21:23:46.	13.9	9.683	9.152	8.887	2.28	17.9 \pm 3.0	
LP 729-55	10:18:36.2	-11:43:01	15.2	11.087	10.569	10.240	7.59	50.1 \pm 7.6	G 162-44
LP 670-5*	10:25:02.8	-9:05:14	14.9	10.972	10.468	10.161	9.35	21.1 \pm 1.9	LHS 2258
LP 848-55	10:29:34.5	-23:07:23	16.5	11.605	10.993	10.675	9.24	29.7 \pm 2.6	
LP 670-16*	10:35:07.8	-7:32:35	15.7	11.160	10.665	10.371	9.49	21.6 \pm 1.8	
LP 430-46**	10:36:08.6	19:23:30	16.4	11.312	10.716	10.335	10.44	14.9 \pm 1.6	
LP 730-22	10:40:36.5	-10:20:32	14.7	10.511	10.050	9.768	7.32	43.5 \pm 6.6	
LP 128-126	10:40:34.8	52:42:59	14.8	11.008	10.415	10.153	7.62	47.5 \pm 6.7	LHS 5172
LP 431-13*	10:47:33.0	20:07:38.	12.2	8.992	8.335	8.215	7.21	22.7 \pm 3.3	cpm G 58-18
G 58-18*	10:47:33.1	20:07:39.	12.0	8.924	8.305	8.128	7.23	21.8 \pm 3.2	cpm LP 431-13
G 58-22	10:48:56.0	22:53:24.	13.7	10.029	9.435	9.175	7.56	31.2 \pm 4.5	
LP 373-35	10:57:03.8	22:17:20	15.3	11.271	10.680	10.361	9.41	23.6 \pm 2.1	
LP 431-50**	11:03:08.5	15:17:51.	12.3	8.905	8.327	8.049	7.62	18.1 \pm 2.7	
LP 373-53	11:03:54.1	24:17:48	15.9	11.429	10.851	10.506	9.53	24.0 \pm 2.0	LHS 2345
G 197-1	11:04:16.2	61:35:54	14.6	10.761	10.136	9.900	7.30	49.2 \pm 7.5	G 197-1
LP 214-42**	11:08:49.4	39:55:12	15.2	10.769	10.172	9.828	9.37	19.1 \pm 1.6	
G 120-18	11:09:59.9	21:33:23.	14.0	10.251	9.567	9.365	8.22	25.5 \pm 4.3	
LP 792-6	11:13:56.7	-19:03:27	15.6	11.280	10.672	10.328	7.65	53.3 \pm 7.5	cpm LP 792-5
G 122-8	11:15:26.5	41: 5:16.	12.4	8.990	8.309	8.083	6.72	28.5 \pm 4.3	
LP 19-292	11:18:20.0	78:37:49	14.6	10.808	10.244	9.968	7.56	44.7 \pm 6.8	G 253-48
LP 792-14**	11:19:48.2	-16:32:38	15.2	10.642	10.079	9.811	9.53	16.6 \pm 1.4	
LP 264-45*	11:22:42.7	37:55:48	16.0	11.302	10.656	10.305	9.69	21.0 \pm 1.8	
LP 374-99	11:24:40.1	23:30:57	16.7	11.614	11.013	10.685	8.74	37.6 \pm 4.5	G 120-46
R 448	11:24:45.5	67:33:12.	11.8	8.640	8.054	7.826	6.05	33.0 \pm 5.0	
LP 792-59**	11:25:28.5	-19:01:52	15.0	10.671	10.169	9.794	9.39	18.0 \pm 1.5	
LP 792-24	11:25:16.3	-17:33:14	15.1	11.149	10.570	10.311	7.60	51.2 \pm 7.6	
LP 732-76	11:27:48.9	-14:24:04	16.6	11.800	11.189	10.846	9.59	27.6 \pm 2.3	
LP 792-31	11:30:29.7	-16:21:08	15.4	11.132	10.564	10.285	7.58	51.3 \pm 8.6	
LP 851-68	11:39:31.5	-24:39:01	15.4	11.338	10.697	10.422	8.55	36.1 \pm 6.1	
LP 38-362	11:44:46.5	69:46:45.	14.2	10.380	9.799	9.571	6.93	49.1 \pm 7.5	
G 197-31	11:47:33.1	60:50:27.	13.9	10.101	9.506	9.258	7.05	40.8 \pm 6.2	
LP 908-5*	12:01:42.1	-27:37:45	18.2	12.097	11.556	11.221	10.44	21.5 \pm 2.2	
LP 794-19	12:05:46.6	-18:49:31	16.0	11.229	10.659	10.340	9.43	22.9 \pm 1.9	
LP 674-14	12:06:32.6	-6:54:18	16.2	11.479	10.878	10.564	8.58	37.9 \pm 6.4	
LP 908-21	12:08:34.5	-28:39:27	15.8	11.347	10.846	10.509	9.36	25.0 \pm 2.1	
LP 734-29**	12:08:43.7	-11:33:44	15.8	10.992	10.473	10.159	10.00	15.8 \pm 1.3	
LP 39-66	12:12:15.2	71:25:23.	13.2	8.810	8.200	7.947	6.88	24.3 \pm 3.7	
LP 794-23*	12:08:18.2	-21:01:05	16.0	11.150	10.572	10.204	9.62	20.3 \pm 1.7	
LP 170-66*	12:09:06.5	47:35:35	15.4	11.092	10.557	10.259	9.40	21.8 \pm 1.8	LHS 2517, cpm LHS 2516
LP 794-38	12:13:15.0	-21:08:32	15.4	11.096	10.557	10.258	8.50	33.0 \pm 5.6	
LP 614-67	12:17:42.7	01:20:54	14.7	10.666	10.063	9.815	7.47	43.7 \pm 6.7	
LP 794-49	12:18:37.9	-20:24:07	15.3	10.891	10.325	10.057	8.45	30.7 \pm 5.2	
LHS6230	12:19:34.8	-4:26:29	14.5	10.632	10.045	9.726	8.22	30.4 \pm 5.1	G 13-30
G 197-53	12:19:38.4	58:12:19	14.8	11.061	10.438	10.145	7.47	52.2 \pm 8.0	
S52-34	12:19:48.8	-23:32:04.	14.2	10.487	9.915	9.589	2.31	25.5 \pm 4.3	
LP 794-53**	12:20:05.1	-18:12:59	14.9	10.550	10.036	9.645	9.23	18.3 \pm 1.5	
G 148-53	12:23:44.9	29:58:58.	13.8	10.107	9.427	9.236	7.11	39.7 \pm 5.8	
LP 675-7**	12:23:52.0	-8:58:43	17.0	11.850	11.329	10.961	10.44	19.1 \pm 2.0	
LP 852-50**	12:27:02.2	-25:44:59	14.9	10.845	10.279	9.934	9.36	19.9 \pm 1.7	

Table 2—Continued

name	α (2000)	δ	m_r	J	H	K_S	M_J	d (pc.)	Notes
LP 909-5	12:29:45.2	-28:47:36	15.4	11.113	10.582	10.255	8.53	32.8 \pm 5.5	
LP 909-6	12:30:19.6	-28:24:30	15.2	10.830	10.223	9.966	8.36	31.2 \pm 5.2	
LP 321-38	12:33:30.9	32:20:14	14.9	10.985	10.429	10.096	8.29	34.6 \pm 5.8	
G 59-34**	12:41:28.9	19:05:01.	14.3	10.402	9.807	9.482	9.42	15.7 \pm 1.3	
LP 377-54	12:42:29.6	25:03:42.	14.4	10.761	10.086	9.779	2.36	27.9 \pm 4.7	
LP 853-27	12:42:51.5	-26:53:59	15.8	11.571	10.980	10.615	8.54	40.4 \pm 6.8	
G 61-10	12:44:05.7	17:19:27.	14.1	10.406	9.831	9.588	7.59	36.5 \pm 5.2	
LP 95-334	12:44:29.5	58:42:01	15.1	11.159	10.564	10.313	7.53	53.2 \pm 8.1	Note 9
G 61-13	12:46:14.3	15:06:16.	14.1	10.398	9.807	9.530	7.57	36.8 \pm 5.2	
LP 853-38	12:47:40.1	-27:46:42	14.7	10.880	10.292	10.025	7.49	47.7 \pm 7.3	
LP 20-439	12:47:13.9	75:28:12	14.7	10.623	10.070	9.805	7.48	42.5 \pm 6.5	G 255-19
LP 676-70	12:49:14.7	-4:50:46	15.9	11.438	10.869	10.563	7.65	57.3 \pm 8.7	
LP 377-90	12:52:09.7	22:44:12.	11.9	8.603	7.969	7.772	5.96	33.8 \pm 4.9	
LP 131-75	12:53:48.3	54:11:11	15.4	11.271	10.647	10.392	9.32	24.6 \pm 2.1	
LP 496-48**	12:54:50.8	11:59:15	14.5	10.477	9.883	9.569	9.53	15.5 \pm 1.4	
LP 172-4**	12:54:32.1	44:59:35	15.5	10.882	10.321	9.984	9.46	19.2 \pm 1.6	LHS 2650
LP 267-403*	12:57:50.8	37:59:50	15.3	10.926	10.309	10.054	9.27	21.4 \pm 1.9	LHS 2655
LP 20-514	12:58:03.9	74:25:32	15.2	10.668	10.074	9.796	7.09	52.0 \pm 7.9	G 255-24
LP 796-24	13:00:40.2	-20:10:43	14.6	10.832	10.211	9.898	8.57	28.3 \pm 4.8	
LP 736-27	13:07:20.9	-10:19:46	15.2	10.899	10.304	10.039	8.57	29.2 \pm 4.9	
LP 172-53	13:13:05.4	44:15:45	14.7	10.730	10.174	9.869	7.63	41.7 \pm 5.9	
LP 21-95	13:14:15.5	79:14:48.	12.0	8.612	7.964	7.796	5.94	34.2 \pm 5.2	
LP 910-62	13:16:34.6	-27:39:12	15.7	11.500	10.947	10.597	9.32	27.3 \pm 2.3	CE 327, Note 10
LP 617-34	13:20:17.4	-2:24:12	14.5	10.643	10.091	9.835	8.42	27.8 \pm 4.7	Note 11
LP 323-26	13:20:33.1	27:12:58.	13.3	9.502	8.956	8.853	6.71	36.2 \pm 5.2	
LP 218-89	13:22:19.3	39:02:39	16.4	11.661	11.013	10.731	9.90	22.5 \pm 1.9	
LP 132-189	13:23:48.4	53: 6:11.	14.3	10.359	9.817	9.554	6.28	65.4 \pm 10.0	
G 199-169	13:25:23.6	57:57:58.	14.3	10.124	9.586	9.341	6.80	46.2 \pm 7.1	
LP 96-136	13:26:11.7	59:47:36.	12.7	9.188	8.604	8.392	6.08	41.9 \pm 6.4	
LP 437-81	13:26:58.0	15:05:43	14.9	11.062	10.509	10.158	9.34	22.1 \pm 1.9	
LP 219-28	13:29:30.8	41:10:25	15.2	11.170	10.609	10.325	8.35	36.6 \pm 6.2	LHS 5252
LP 21-586	13:36:12.6	74:26:27.	14.2	10.047	9.500	9.178	6.71	46.4 \pm 7.1	
G 200-4	13:46:51.1	49:32:33.	13.7	10.123	9.504	9.250	7.25	37.6 \pm 6.0	
LP 856-6	13:49:06.4	-23:54:07	14.9	11.036	10.518	10.209	8.34	34.6 \pm 5.8	LHS 5258
LP 798-49	13:51:57.1	-17:58:49	14.7	10.834	10.208	9.931	7.63	43.8 \pm 7.4	
LP 220-13**	13:56:41.4	43:42:58	17.5	11.704	11.031	10.634	10.70	15.8 \pm 1.7	Note 17
LP 133-377	14:05:24.6	55:23:44	16.0	11.451	10.830	10.597	8.49	39.1 \pm 6.6	
LP 912-49*	14:06:49.4	-30:18:27	16.2	11.332	10.655	10.399	9.79	20.3 \pm 1.7	LHS 2859, Note 12
LP 220-50**	14:09:31.9	41:38:08	15.0	10.671	10.134	9.854	9.52	17.0 \pm 1.4	
LP 679-32	14:12:06.9	-4:13:48	17.0	11.600	11.036	10.715	9.41	27.4 \pm 2.3	Note 13
G 124-13	14:13:56.0	-4:35:03	15.6	11.410	10.829	10.554	7.54	59.5 \pm 10.0	
LP 325-4*	14:14:15.1	28:47:25	14.8	11.000	10.399	10.145	9.31	21.8 \pm 1.8	
LP 325-24	14:20:36.4	31:30:04	14.7	10.759	10.153	9.905	8.49	28.4 \pm 4.8	
LP 381-49**	14:22:20.0	23:52:35.	14.3	10.524	9.924	9.663	9.81	13.9 \pm 1.2	
LP 740-6*	14:23:23.8	-14:55:35	15.6	11.078	10.516	10.215	9.52	20.5 \pm 1.7	
LP 800-58**	14:25:13.3	-16:24:56	16.6	11.469	10.918	10.478	10.44	16.1 \pm 1.7	
LP 500-35**	14:28:04.2	13:56:13	16.2	11.004	10.409	10.023	10.44	13.0 \pm 1.4	LHS 2919
LP 740-58	14:31:52.7	-15:15:51	15.5	11.144	10.607	10.310	8.56	32.9 \pm 5.5	
LP 740-25	14:31:53.6	-13:46:09	15.6	11.263	10.688	10.381	8.44	36.7 \pm 6.2	

Table 2—Continued

name	α (2000)	δ	m_r	J	H	K_S	M_J	d (pc.)	Notes
LP 221-151	14:32:09.2	44:00:10	14.7	10.533	9.938	9.649	7.56	39.3 \pm 6.2	G 178-34
LP 325-68	14:37:18.4	26:52:59	14.8	11.036	10.412	10.122	7.66	47.4 \pm 8.0	
LP 858-8	14:40:37.9	-26:05:19	16.2	11.581	11.046	10.758	9.34	28.1 \pm 2.5	
LP 740-44**	14:41:46.0	-14:27:17	15.9	10.949	10.470	10.078	9.74	17.4 \pm 1.5	
LP 914-13	14:42:31.4	-28:38:25	15.1	11.137	10.523	10.296	7.43	55.2 \pm 8.4	
LP 858-20	14:44:15.0	-27:17:25	15.2	10.857	10.342	10.047	8.49	29.7 \pm 5.0	
LP 914-18	14:46:17.3	-31:59:57	17.2	11.958	11.318	11.054	9.70	28.3 \pm 2.5	CE 484, Note 10
LP 272-8	14:51:17.5	33:37:46	16.3	11.611	11.014	10.697	9.46	26.9 \pm 2.3	
LP 272-15	14:54:57.0	37:14:55.	14.2	10.440	9.758	9.542	6.83	52.8 \pm 8.1	
LP 441-34**	14:56:27.8	17:55:07	17.5	11.931	11.320	10.936	10.70	17.6 \pm 1.8	LHS 3002, Note 14
LP 914-39	15:01:39.5	-28:28:26	14.9	11.042	10.429	10.168	7.30	56.0 \pm 8.6	
LP 98-370	15:02:15.5	60:43:51	14.6	10.536	9.919	9.714	7.20	46.5 \pm 7.1	G 224-41
LP 914-41	15:03:13.2	-28:40:13	16.7	11.511	11.010	10.630	9.66	23.5 \pm 2.1	
LP 859-1**	15:04:16.2	-23:55:56	18.4	12.025	11.389	11.031	10.94	16.3 \pm 1.7	Note 15
LP 442-72	15:15:15.0	18:11:35	14.5	10.631	9.934	9.697	7.30	46.3 \pm 7.3	G 136-83
LP 222-65**	15:16:40.7	39:10:48	16.0	10.817	10.184	9.873	9.97	14.8 \pm 1.2	
LP 136-136**	15:26:33.1	55:22:20	14.8	10.716	10.129	9.828	9.29	19.3 \pm 1.7	G 201-49
LP 443-16	15:34:27.1	15:28:32	14.7	10.758	10.256	9.937	7.62	42.3 \pm 6.0	
LP 443-17**	15:34:50.8	18:00:13	14.9	10.630	10.021	9.731	9.43	17.4 \pm 1.5	
LP 916-16	15:39:51.3	-32:15:06	15.0	10.746	10.179	9.901	7.64	41.9 \pm 7.0	
LP 177-102**	15:47:27.4	45:07:51	14.2	9.087	8.451	8.189	7.64	19.5 \pm 2.7	
LP 22-420**	15:49:55.1	79:39:51	14.5	9.699	9.151	8.859	9.30	12.0 \pm 1.1	G 256-25
LP 860-46	15:53:57.1	-23:11:52	16.3	11.570	10.957	10.636	9.43	26.8 \pm 2.2	
G 180-17	15:58: 5.4	39: 2:14.	14.4	10.312	9.753	9.497	7.48	36.8 \pm 5.9	
G 225-41	15:59: 0.0	60: 9:40.	14.0	9.913	9.302	9.015	6.51	47.9 \pm 7.3	
LP 385-9	15:59:29.2	23:21:38	14.9	10.954	10.365	10.052	8.45	31.7 \pm 5.3	LHS 3140
LP 224-38**	16:06:33.8	40:54:21	16.4	11.036	10.431	10.101	10.15	15.0 \pm 1.6	LHS 3154
BD12:4492B	16:08:24.4	-13:07:52	14.9	9.408	8.794	8.572	7.32	26.2 \pm 4.0	
LP 177-391	16:08:59.7	50:33:39	15.0	10.969	10.387	10.091	8.52	30.9 \pm 5.2	
LP 917-23	16:15:30.5	-32:51:00	14.7	10.251	9.668	9.401	8.30	24.6 \pm 4.1	
G 225-54**	16:16:42.2	58:39:43	14.9	10.201	9.550	9.229	9.31	15.1 \pm 1.3	
LP 445-56	16:21:38.0	17:13:33.	12.1	8.109	7.510	7.316	5.57	32.1 \pm 4.7	
LP 43-79	16:31: 1.9	73: 3:31.	14.2	10.170	9.572	9.286	7.46	34.8 \pm 5.9	
G 202-60	16:34:25.4	47:50:28	14.8	10.733	10.164	9.856	8.40	29.3 \pm 4.9	
LP 275-74**	16:37:01.4	35:35:45	16.0	11.153	10.531	10.270	9.82	18.5 \pm 1.5	LHS 3227
LP 276-22**	16:46:31.5	34:34:55	15.7	10.555	9.950	9.584	10.44	10.5 \pm 1.1	LHS 3241
LP 226-11	16:54:02.8	44:12:29	15.0	11.132	10.553	10.290	8.40	35.3 \pm 5.9	
LP 226-38	17:07:12.6	41:36:44	14.6	10.690	10.145	9.824	8.62	25.9 \pm 4.4	
LP 446-34	17:07:20.8	16:12:21.	14.3	10.625	9.994	9.730	7.37	44.7 \pm 6.5	
G 203-50	17:11:46.0	40:29:01	15.0	11.094	10.548	10.208	9.34	22.4 \pm 1.9	
G 240-52	17:15: 4.7	66:52:59.	13.8	9.979	9.381	9.098	7.00	39.5 \pm 6.0	
LP 447-35	17:17:09.1	19:20:47	15.4	11.207	10.606	10.276	7.46	56.2 \pm 7.9	
LP 507-15*	17:21:02.7	12:58:43	15.8	11.075	10.470	10.183	9.43	21.4 \pm 1.8	
LP 807-62	17:25:56.8	-15:57:07	15.1	11.187	10.581	10.319	6.95	70.3 \pm 10.8	
LP 332-33	17:31:45.1	30:56:05	14.7	10.954	10.327	10.061	8.46	31.6 \pm 5.3	
LP 278-44	17:51:58.5	36:10:59	18.9	12.619	12.073	11.730	10.44	27.3 \pm 2.9	
LP 278-50	17:55:49.8	38:42:13	16.1	11.486	10.884	10.603	9.32	27.2 \pm 2.3	
LHS 3350	18:01:16.0	35:35:51.	13.3	9.721	9.166	8.888	7.44	28.6 \pm 4.4	
LP 71-82**	18:02:16.6	64:15:44	13.5	8.539	7.967	7.664	9.28	7.1 \pm 0.6	

Table 2—Continued

name	α (2000)	δ	m_r	J	H	K_S	M_J	d (pc.)	Notes
G 206-3	18:02:32.2	30:27:05	14.6	10.397	9.819	9.528	7.53	37.4 \pm 5.7	
G 183-39	18:23:06.7	15:48:44.	14.1	10.325	9.706	9.464	7.33	39.7 \pm 5.8	
G 205-21	18:25:52.7	40:40:06	14.6	10.647	10.084	9.861	7.42	44.3 \pm 6.8	
LP 182-4*	18:30:55.2	47:35:59	16.1	11.290	10.667	10.400	9.65	21.3 \pm 1.9	
G 205-26	18:31:15.2	39:18:51	14.7	10.538	9.989	9.705	7.48	40.9 \pm 6.2	
LP 335-12**	18:39:33.0	29:52:16	17.2	10.964	10.381	9.960	10.44	12.7 \pm 1.4	
LP 391-12	18:41:07.5	21:53:43.	12.3	9.022	8.338	8.209	5.57	49.1 \pm 7.1	
G 206-41	18:42:37.2	31:11:06	15.2	11.171	10.577	10.286	9.26	24.1 \pm 2.1	
G 259-33	18:43:14.8	76:59:37	14.7	10.726	10.123	9.885	6.75	62.3 \pm 9.5	
LHS 3406**	18:43:22.1	40:40:21.	17.5	11.299	10.667	10.269	10.94	11.8 \pm 1.2	
G 184-22	18:44:16.7	22:09:23.	14.0	10.062	9.492	9.249	7.48	32.8 \pm 4.8	
LP 141-7	18:51:22.3	53:01:22	14.9	10.306	9.716	9.391	7.63	34.3 \pm 4.8	
LP 141-11	18:56:26.4	53:55:47	15.8	11.222	10.588	10.317	7.38	58.6 \pm 9.2	
LP 230-40*	19:19:41.0	41:27:49	15.9	11.232	10.707	10.356	9.60	21.2 \pm 1.8	
LP 754-14	20:04:18.4	-12:20:31	18.9	12.827	12.153	11.829	10.15	34.3 \pm 3.6	
LP 694-36	20:13:50.7	-4:26:14	15.3	11.101	10.569	10.295	8.50	33.1 \pm 5.6	
G 144-18	20:37:32.1	18:58:27	14.6	10.833	10.247	9.899	7.63	43.8 \pm 6.8	
LP 871-38*	20:38:46.1	-21:06:45	15.2	10.998	10.425	10.112	9.40	20.9 \pm 1.7	
LP 927-32	20:39:23.8	-29:26:33	16.7	11.346	10.768	10.352	10.15	17.3 \pm 1.8	LHS 3566, Note 1
LP 636-16*	20:52:31.5	-1:47:08	14.8	10.890	10.432	10.041	9.22	21.6 \pm 1.9	
LP 396-18	21:02:47.0	22:37:12	16.1	11.119	10.582	10.342	7.68	48.8 \pm 6.9	Note 2
LP 516-31	21:06:35.5	13:39:08	14.7	10.739	10.144	9.932	7.37	47.2 \pm 7.2	
R 772*	21:13:52.4	18:05:59.	12.3	8.977	8.362	8.105	7.15	23.2 \pm 3.4	
LP 397-8	21:15:41.7	21:28:28	14.7	10.697	10.129	9.859	7.62	41.2 \pm 6.3	
LP 397-10*	21:16:06.2	22:38:46	17.3	11.787	11.290	10.815	10.15	21.3 \pm 2.1	Note 2
LP 457-38	21:28:05.4	17:53:59.	11.8	8.902	8.223	8.051	6.43	31.3 \pm 4.5	
LP 698-2**	21:32:29.7	-5:11:58	16.6	11.439	10.715	10.385	10.15	18.0 \pm 2.0	Note 2
LP 758-16*	21:39:03.6	-10:48:43	15.5	11.296	10.787	10.513	9.77	20.2 \pm 1.7	LHS 3697
LP 930-22**	21:41:46.7	-27:04:54	14.7	10.706	10.086	9.792	9.45	17.8 \pm 1.6	
LP 698-29	21:42:02.3	-3:35:10	14.8	11.035	10.429	10.151	7.54	50.0 \pm 7.0	
LP 874-18	21:42:25.3	-26:24:03	15.6	11.301	10.767	10.448	9.48	23.2 \pm 1.9	
LP 983-5	21:49:48.4	-34:12:26	15.3	11.247	10.685	10.392	7.58	54.1 \pm 8.3	
LP 638-50	21:51:27.0	-1:27:14	16.2	11.309	10.746	10.380	9.60	22.0 \pm 1.8	Note 2
LP 759-23	22:05:09.3	-12:40:45	14.8	10.992	10.447	10.151	8.51	31.4 \pm 5.3	
LP 759-25*	22:05:35.7	-11:04:28	16.7	11.682	11.060	10.726	10.15	20.2 \pm 2.1	Notes 2, 16
LP 699-32**	22:06:09.6	-7:23:35	15.2	10.653	10.070	9.764	9.61	16.1 \pm 1.4	
LP 759-47	22:10:55.9	-9:36:00	15.9	11.533	10.893	10.548	9.61	24.2 \pm 2.1	
LP 1032-84	22:14:40.7	-41:10:54.	16.9	11.717	11.142	10.804	9.56	27.0 \pm 2.3	
CD-24:17099B	22:17:32.6	-23:42:14.	11.0	8.373	7.703	7.494	5.77	33.1 \pm 4.8	
LP 983-134	22:18:13.6	-37:13:49	16.2	11.421	10.850	10.558	8.74	34.4 \pm 4.2	
LP 700-2	22:21:30.6	-4:24:47	14.7	10.812	10.153	9.922	8.37	30.8 \pm 5.2	
LP 820-19	22:26:01.1	-15:18:12	15.7	11.458	10.890	10.569	9.65	23.0 \pm 1.9	
G 215-48	22:29:15.2	43:19:56	15.1	11.025	10.518	10.260	8.21	36.6 \pm 6.2	
LP 876-6	22:42:49.8	-26:15:41	15.4	10.891	10.250	9.989	7.53	47.1 \pm 6.6	
LP 821-14	22:46:03.2	-19:06:54	14.5	10.807	10.171	9.880	7.48	46.3 \pm 7.3	
LP 237-32	22:47:37.6	40:41:25.	14.3	10.364	9.797	9.524	7.35	40.1 \pm 6.4	
LP 521-18*	22:48:22.4	12:32:10	15.9	11.206	10.627	10.226	9.59	21.0 \pm 1.8	LHS 3856, Note 2
LP 401-10	22:54:11.1	25:27:56	16.5	11.629	11.030	10.695	9.61	25.4 \pm 2.1	Note 2
G 128-35	23:08:34.4	29:20:45	14.5	10.708	10.093	9.857	8.49	27.8 \pm 4.7	

Table 2—Continued

name	α (2000)	δ	m_r	J	H	K_S	M_J	d (pc.)	Notes
LP 985-98	23:09:14.2	-35:31:59	16.9	12.035	11.351	10.986	8.82	43.9 \pm 5.3	
LP 702-50 **	23:15:54.4	-6:27:46	15.8	11.130	10.480	10.275	9.89	17.7 \pm 1.5	
LP 934-33	23:22:23.6	-27:25:44	16.4	11.594	11.053	10.752	9.64	24.6 \pm 2.1	Note 2
LP 346-21*	23:23:59.8	28:34:03	15.1	10.953	10.340	10.097	9.39	20.5 \pm 1.7	LHS 3940
R 247	23:30:41.7	46:39:56.	13.7	9.960	9.353	9.129	6.40	51.4 \pm 7.9	
G 273-77	23:35:11.9	-15:23:32	14.8	10.343	9.769	9.489	7.21	42.4 \pm 6.5	
LP 763-36	23:36:23.5	-10:41:44	14.5	10.695	10.097	9.816	8.49	27.7 \pm 4.6	G 273-80
LP 763-3**	23:37:38.3	-12:50:27	16.7	11.461	10.851	10.427	10.15	18.3 \pm 1.7	Note 2
LP 763-38*	23:37:14.9	-8:38:08	18.0	12.246	11.603	11.206	10.70	20.4 \pm 2.0	
LP 703-42**	23:41:39.2	-6:35:50	14.5	10.362	9.704	9.389	9.45	15.2 \pm 1.3	
LP 763-61**	23:46:19.1	-11:56:43	14.9	10.711	10.101	9.766	9.40	18.3 \pm 1.5	G 273-133
LP 239-52**	23:47:20.6	42:38:08	16.2	10.942	10.353	10.094	9.67	18.0 \pm 1.6	Note 2
LP 239-57	23:51:24.4	42:04:13	16.1	11.560	10.997	10.664	9.31	28.2 \pm 2.4	
G 130-31	23:59:19.8	32:41:24	14.5	10.418	9.793	9.579	7.48	38.6 \pm 6.5	

Note. —

** - stellar systems with formal distance estimate $d < 20$ parsecs

* - stellar systems with formal distance estimates within 1σ of our 20 parsec limit

1. see Gizis *et al.*, 2000b, and Paper V

2. see also Paper III

3. also listed as APMPM J0150-3319, Scholz *et al.*, 2000.

4. LP 30-55 = G 245-40 is listed as GJ 3125 in the CNS3 and included in the PMSU survey.

5. LP 301-8 is listed as LP 301-63 in SIMBAD; photometry by Weis & Hanson (1988) give $V=15.04$, $(V-R)_C=1.29$, $(V-I)_C=2.96$. The star is a possible member of the Hyades cluster. 6. LP 891-13 is a wide cpm companion of the white dwarf WD0443-275, see Silvestri *et al.*(2001).

7. DENIS-P J060254.2-091503, see Phan-Bao *et al.*, 2001.

8. LP 429-12/LHS 2215 - spectral type M6, Bessell, 1991.

9. LP 95-334 is a cpm companion of HD 110869, G5, $\pi_{Hip} = 22.10 \pm 0.81$ milliarcseconds.

10. see Ruiz *et al.*, 2001.

11. LP 617-34 is a wide cpm companion of the DA white dwarf, LP 617-35, Silvestri *et al.*, 2001.

12. DENIS-P J140649.3-301828, see Phan-Bao *et al.*, 2001.

13. DENIS-P J141206.9-041348, see Phan-Bao *et al.*, 2001.

14. LHS 3002 is listed as GJ 3879B in the CNS3 and included in the PMSU survey. The cpm companion is LHS 3001, for which we measure a photometric distance of 18.0 \pm 1.3 (Paper I)

15. 2MASSW J1504162-235556, see Reid *et al.*, 2002.

16. LP 759-25 = BRI B2202-1119, Kirkpatrick, Henry & Irwin, 1997.

17. see also Paper V

Table 3. Narrowband indices for NLTT dwarfs

name	TiO5	CaOH	CaH1	CaH2	CaH3	TiO-a	Vo-a	H α	Sp. Type
LP 824-354	0.44	0.48	0.89	0.48	0.73	1.46	1.92	0.94	M3.5
LP 824-355	0.50	0.53	0.86	0.58	0.81	1.37	1.89	0.94	M3.0
LP 191-43	0.27	0.25	0.71	0.29	0.56	2.25	2.02	1.22	M5.5
LP 644-53	0.37	0.39	0.80	0.39	0.65	1.69	2.00	1.58	M4.5
LP 880-607	0.44	0.40	0.80	0.45	0.71	1.47	1.94	0.95	M3.5
LP 149-35	0.32	0.38	0.83	0.38	0.67	1.95	2.01	1.84	M5.0
LP 880-754	0.65	0.57	0.84	0.55	0.78	1.19	1.96	0.96	M1.5
LP 824-286	0.42	0.41	0.83	0.41	0.71	1.52	1.96	0.99	M3.5
LP 645-4	0.31	0.33	0.77	0.34	0.62	2.04	2.02	2.05	M5.0
LP 585-20	0.45	0.44	0.81	0.44	0.69	1.41	1.99	0.98	M3.5
LP 193-488	0.35	0.38	0.79	0.38	0.65	1.70	1.99	1.25	M4.5
LP 585-28	0.41	0.42	0.81	0.44	0.71	1.49	1.97	1.01	M3.5
LP 349-25	0.20	0.21	0.94	0.25	0.51	3.18	2.26	2.19	M8.0
LP 150-13	0.39	0.41	0.80	0.42	0.68	1.53	1.98	0.98	M4.0
LP 585-49	0.41	0.41	0.82	0.42	0.70	1.53	1.98	0.96	M4.0
LP 585-48	0.40	0.43	0.82	0.43	0.70	1.54	1.97	0.97	M4.0
LP 765-49	0.37	0.38	0.77	0.38	0.63	1.66	1.98	1.39	M4.5
LP 585-58	0.37	0.35	0.77	0.39	0.66	1.61	1.99	1.04	M4.5
G 268-11	0.43	0.42	0.82	0.44	0.70	1.50	1.96	0.99	M3.5
LP 705-93	0.35	0.35	0.78	0.35	0.62	1.81	2.00	1.41	M4.5
G 132-25	0.31	0.34	0.78	0.34	0.61	1.92	2.01	1.41	M5.0
LP 406-35	0.34	0.39	0.79	0.36	0.63	1.90	2.02	1.75	M4.5
LP 646-49	0.36	0.39	0.82	0.41	0.71	1.63	2.01	1.01	M4.5
LP 406-58	0.41	0.36	0.75	0.40	0.65	1.51	2.00	0.98	M4.0
LP 938-91	0.40	0.46	0.90	0.41	0.71	1.57	1.98	0.98	M4.0
LP 647-13	0.50	0.44	0.95	0.47	0.76	1.73	2.37	4.99	M9.0
LP 707-17	0.36	0.38	0.81	0.40	0.70	1.64	1.98	0.98	M4.5
LP 467-17	0.25	0.45	0.88	0.34	0.66	1.92	1.98	0.89	M5.5
LP 938-144	0.35	0.39	0.78	0.36	0.65	1.75	1.99	1.28	M4.5
LP 938-149	0.38	0.33	0.81	0.38	0.68	1.69	2.01	0.96	M4.5
LP 194-43	0.37	0.40	0.78	0.40	0.67	1.69	1.99	1.44	M4.5
LP 991-15	0.38	0.38	0.76	0.38	0.65	1.64	1.98	1.25	M4.5
LP 243-18	0.40	0.43	0.80	0.41	0.67	1.62	2.00	1.45	M4.0
LDS3284B	0.53	0.51	0.81	0.51	0.75	1.30	1.98	0.98	M2.5
G 172-56	0.36	0.43	0.80	0.40	0.66	1.77	2.01	2.03	M4.5
G 133-25	0.38	0.43	0.86	0.42	0.72	1.64	2.00	0.97	M4.5
LP 296-11	0.32	0.31	0.73	0.34	0.61	1.84	2.02	1.21	M5.0
LP 940-20	0.39	0.38	0.83	0.40	0.71	1.68	2.01	1.12	M4.5
G 94-16	0.34	0.37	0.78	0.37	0.63	1.84	2.01	1.45	M4.5
LP 884-94	0.37	0.29	0.70	0.34	0.61	1.62	2.00	0.99	M4.5
LP 196-17	0.33	0.36	0.81	0.37	0.64	1.89	2.01	1.67	M4.5
G 3-31	0.41	0.44	0.83	0.44	0.72	1.51	1.97	0.97	M4.0
LP 30-55	0.38	0.31	0.71	0.34	0.58	1.74	1.94	1.29	M4.5
LP 589-25	0.28	0.32	0.77	0.30	0.57	2.11	2.03	1.54	M5.5
G 4-5	0.43	0.49	0.87	0.47	0.75	1.45	1.95	0.93	M3.5
LP 769-58	0.32	0.33	0.80	0.39	0.69	1.69	2.00	0.93	M4.5
LP 829-41	0.25	0.27	0.80	0.30	0.61	2.00	2.04	0.96	M5.5
G 134-30	0.38	0.39	0.78	0.40	0.66	1.54	1.98	1.00	M4.5
G 36-14	0.35	0.38	0.85	0.41	0.71	1.68	1.97	0.98	M4.5

Table 3—Continued

name	TiO5	CaOH	CaH1	CaH2	CaH3	TiO-a	Vo-a	H α	Sp. Type
LP 770-16	0.30	0.24	0.75	0.32	0.64	1.97	2.06	1.58	M5.5
LP 650-181	0.61	0.59	0.83	0.58	0.79	1.19	1.96	0.96	M1.5
LP 298-43	0.38	0.38	0.79	0.39	0.64	1.64	1.97	1.28	M4.5
LP 134-63	0.33	0.37	0.77	0.36	0.64	1.90	2.02	1.69	M4.5
G 37-23	0.39	0.41	0.84	0.44	0.73	1.61	1.98	0.95	M4.5
LP 246-43	0.39	0.41	0.79	0.41	0.68	1.64	2.01	1.36	M4.5
LP 198-649	0.56	0.50	0.80	0.53	0.77	1.26	1.98	0.96	M2.5
LP 356-158	0.42	0.47	0.82	0.47	0.74	1.50	1.98	0.94	M3.5
LP 31-200	0.42	0.39	0.80	0.42	0.69	1.50	2.00	1.01	M3.5
LHS5079	0.36	0.35	0.80	0.43	0.72	1.62	1.97	0.95	M4.5
LP 473-26	0.37	0.41	0.82	0.37	0.64	1.81	1.97	1.64	M4.5
LP 833-4	0.36	0.43	0.76	0.37	0.60	1.73	1.99	2.97	M4.5
LP 773-43	0.38	0.37	0.85	0.38	0.70	1.57	1.99	0.98	M4.5
LP 301-8	0.37	0.40	0.79	0.39	0.65	1.72	1.99	1.62	M4.5
LP 3-243	0.41	0.40	0.76	0.39	0.64	1.59	1.98	1.38	M4.0
LP 301-14	0.40	0.42	0.81	0.42	0.71	1.58	1.98	0.95	M4.0
LP 31-433	0.36	0.33	0.78	0.38	0.65	1.62	2.00	1.01	M4.5
LP 833-49	0.41	0.44	0.78	0.42	0.68	1.49	1.96	0.97	M3.5
LP 357-219	0.99	0.97	1.01	0.96	0.95	1.00	1.98	0.86	K5.5
G 38-27	0.38	0.41	0.88	0.44	0.73	1.55	1.98	0.95	M4.5
LP 655-3	0.29	0.29	0.74	0.33	0.59	1.90	1.98	1.29	M5.5
LP 775-20	0.45	0.47	0.87	0.46	0.73	1.53	1.92	1.04	M3.5
LP 595-21	0.39	0.42	0.79	0.40	0.65	1.61	1.98	1.23	M4.0
LP 415-217	0.28	0.31	0.81	0.36	0.65	1.85	2.04	0.92	M5.5
LP 415-213	0.37	0.46	0.87	0.42	0.71	1.65	2.00	1.03	M4.5
G 8-53	0.36	0.35	0.82	0.39	0.69	1.65	1.98	0.99	M4.5
LP 891-13	0.35	0.48	0.79	0.39	0.62	1.73	1.95	2.43	M4.5
G 656-8	0.34	0.38	0.85	0.40	0.69	1.65	2.01	0.97	M4.5
LP 835-18	0.34	0.34	0.75	0.34	0.61	1.89	2.01	1.55	M4.5
G 84-25	0.39	0.40	0.79	0.40	0.67	1.60	1.99	1.16	M4.0
LP 777-2	0.27	0.36	0.88	0.38	0.69	1.83	2.07	0.92	M5.5
LP 15-315	0.35	0.36	0.79	0.39	0.67	1.64	1.98	0.99	M4.5
G 85-42	0.38	0.35	0.78	0.40	0.67	1.53	1.98	0.95	M4.5
LP 717-4	0.51	0.49	0.79	0.48	0.72	1.32	1.98	0.97	M2.5
LP 717-3	0.32	0.33	0.79	0.33	0.62	1.97	2.02	1.24	M4.5
LP 892-9	0.45	0.40	0.82	0.44	0.72	1.49	1.97	0.98	M3.5
LP 892-32	0.30	0.29	0.79	0.33	0.62	1.85	2.02	0.96	M5.5
LP 892-36	0.37	0.34	0.73	0.36	0.62	1.61	2.00	0.99	M4.5
LP 717-33	0.46	0.46	0.85	0.46	0.73	1.40	1.97	0.98	M3.5
LP 718-5	0.20	0.27	0.85	0.27	0.61	2.66	2.16	1.39	M6.5
LP 658-106	0.20	0.22	0.75	0.25	0.51	2.77	2.10	1.43	M6.0
LP 120-4	0.32	0.36	0.85	0.40	0.71	1.76	2.03	1.09	M4.5
LP 837-20	0.36	0.39	0.82	0.39	0.68	1.72	2.01	1.33	M4.5
LP 659-6	0.35	0.37	0.77	0.36	0.62	1.73	2.00	1.36	M4.5
LP 719-10	0.24	0.31	0.79	0.30	0.59	2.27	2.06	1.44	M5.5
LP 120-46	0.28	0.32	0.84	0.35	0.67	1.94	2.03	0.98	M5.5
LP 160-22	0.33	0.35	0.80	0.35	0.63	1.90	2.02	1.71	M4.5
G 103-47	0.45	0.46	0.81	0.46	0.72	1.43	1.98	0.97	M3.5
G 251-15	0.38	0.37	0.75	0.38	0.64	1.64	1.99	1.49	M4.5

Table 3—Continued

name	TiO5	CaOH	CaH1	CaH2	CaH3	TiO-a	Vo-a	H α	Sp. Type
LP 839-29	0.22	0.34	0.77	0.24	0.50	2.53	2.03	1.66	M6.0
G 103-64	0.41	0.42	0.82	0.42	0.69	1.53	1.99	0.96	M4.0
LP 16-342	0.40	0.41	0.83	0.43	0.69	1.53	1.97	1.04	M4.0
LP 206-11	0.19	0.17	0.78	0.25	0.57	2.32	2.06	0.90	M6.5
LP 482-43	0.39	0.43	0.81	0.42	0.69	1.55	2.00	1.02	M4.0
LP 256-34	0.33	0.38	0.79	0.38	0.66	1.77	2.01	1.08	M4.5
LP 483-33	0.47	0.46	0.78	0.45	0.69	1.38	1.99	0.96	M3.5
LP 17-78	0.38	0.41	0.86	0.43	0.72	1.62	1.97	0.99	M4.5
LP 423-31	0.26	0.40	0.89	0.34	0.65	2.61	2.15	3.71	M7.0
LP 310-28	0.43	0.43	0.76	0.41	0.66	1.50	1.99	1.50	M3.5
G 40-11	0.41	0.39	0.80	0.41	0.68	1.55	1.99	0.97	M4.0
LP 209-4	0.38	0.43	0.85	0.42	0.71	1.58	1.99	0.96	M4.5
LP 209-2	0.28	0.34	0.78	0.32	0.59	2.24	2.06	2.17	M5.5
LP 665-6	0.25	0.24	0.71	0.26	0.53	2.25	2.05	1.28	M5.5
LP 785-4	0.28	0.44	0.63	0.32	0.59	2.25	2.10	1.49	M5.5
LP 844-4	0.38	0.42	0.77	0.38	0.65	1.67	1.99	1.58	M4.5
LP 726-12	0.54	...	...	0.50	0.73	1.32	1.98	1.50	M2.5
LP 209-59	0.28	0.28	0.82	0.34	0.65	1.83	2.02	0.96	M5.5
LP 164-63	0.30	0.27	0.71	0.32	0.59	1.84	1.99	1.15	M5.0
LP 209-68	0.31	0.33	0.82	0.36	0.64	1.70	1.99	0.94	M5.0
LP 844-33	0.31	0.32	0.73	0.34	0.62	1.89	2.00	1.33	M5.0
LP 312-51	0.26	0.32	0.77	0.32	0.61	2.15	2.03	1.63	M5.5
LP 726-36	0.40	0.44	0.86	0.43	0.71	1.49	1.97	0.99	M4.0
LP 726-37	0.32	0.31	0.78	0.35	0.62	1.73	2.00	0.99	M5.0
LP 426-56	0.57	...	...	0.54	0.78	1.26	1.96	0.95	M2.5
LP 427-16	0.55	...	...	0.52	0.77	1.34	1.96	0.98	M2.5
G 195-21	0.37	0.37	0.75	0.36	0.62	1.60	2.01	1.05	M4.5
LP 787-17	0.31	0.30	0.74	0.33	0.64	1.98	2.01	1.88	M5.0
LP 313-38	0.31	0.37	0.85	0.35	0.65	1.95	2.00	1.48	M5.0
LP 210-74	0.38	0.43	0.79	0.40	0.64	1.45	1.99	0.94	M4.5
LP 787-32	0.28	0.33	0.80	0.34	0.65	1.82	2.00	0.95	M5.5
LP 787-45	0.42	0.43	0.79	0.42	0.70	1.46	1.99	0.96	M3.5
LP 728-2	0.38	0.40	0.86	0.41	0.73	1.63	1.99	0.98	M4.5
G 161-47	0.45	0.42	0.75	0.41	0.66	1.41	1.99	0.98	M3.5
LP 428-13	0.34	0.36	0.80	0.37	0.65	1.72	1.98	1.03	M4.5
LP 260-39	0.39	0.46	0.86	0.44	0.73	1.56	1.96	0.95	M4.0
LP 36-234	0.40	0.42	0.83	0.44	0.70	1.51	1.95	1.09	M4.0
LP 314-44	0.16	0.18	0.77	0.23	0.56	2.82	2.19	0.87	M6.5
LP 788-26	0.38	0.43	0.84	0.42	0.71	1.65	1.96	0.94	M4.5
LP 728-23	0.23	0.33	0.73	0.27	0.52	2.41	2.01	1.58	M5.5
LP 788-48	0.40	0.42	0.78	0.40	0.68	1.56	1.98	0.96	M4.0
LP 728-42	0.44	0.46	0.83	0.47	0.75	1.45	1.96	0.98	M3.5
LP 37-33	0.51	0.51	0.84	0.53	0.77	1.32	1.95	0.98	M2.5
LP 729-7	0.44	0.40	0.82	0.44	0.73	1.50	1.95	0.93	M3.5
LP 429-12	0.25	0.29	0.90	0.32	0.69	2.31	2.19	1.26	M6.5
LP 789-23	0.26	0.32	0.69	0.30	0.68	2.33	2.25	1.59	M7.5
LP 729-33	0.33	0.38	0.85	0.39	0.69	1.74	2.02	0.96	M4.5
LP 167-17	0.26	0.28	0.73	0.29	0.55	2.17	2.06	1.34	M5.5
G 54-18	0.41	...	...	0.44	0.72	1.48	1.95	0.93	M4.0

Table 3—Continued

name	TiO5	CaOH	CaH1	CaH2	CaH3	TiO-a	Vo-a	H α	Sp. Type
G 54-19	0.40	...	...	0.38	0.65	1.72	1.98	1.34	M4.0
LP 729-55	0.44	0.44	0.85	0.45	0.75	1.46	1.98	0.97	M3.5
LP 670-5	0.36	0.34	0.78	0.37	0.68	1.64	1.97	1.03	M4.5
LP 848-55	0.34	0.36	0.79	0.38	0.69	1.77	2.01	0.94	M4.5
LP 670-16	0.30	0.31	0.82	0.34	0.65	1.80	2.00	0.92	M5.0
LP 430-46	0.19	0.40	1.04	0.29	0.62	2.17	2.07	0.89	M6.5
LP 730-22	0.51	0.48	0.85	0.47	0.75	1.30	1.96	0.96	M2.5
LP 128-126	0.38	0.42	0.84	0.43	0.71	1.55	1.97	0.94	M4.5
G 58-18	0.51	...	...	0.49	0.75	1.34	1.99	0.92	M2.5
LP 431-13	0.50	...	...	0.50	0.74	1.33	1.97	0.96	M3.0
G 58-22	0.45	...	...	0.44	0.71	1.46	2.02	0.94	M3.5
LP 373-35	0.32	0.34	0.81	0.38	0.66	2.03	2.05	2.26	M5.0
LP 431-50	0.44	...	...	0.42	0.69	1.47	1.99	0.90	M3.5
LP 373-53	0.29	0.32	0.69	0.33	0.68	1.93	2.03	0.96	M5.5
G 197-1	0.47	0.51	0.87	0.48	0.76	1.43	1.98	0.95	M3.5
LP 214-42	0.32	0.36	0.77	0.34	0.60	2.00	2.02	1.34	M4.5
G 120-18	0.41	...	...	0.42	0.71	1.54	1.98	0.93	M4.0
LP 792-6	0.40	0.41	0.88	0.43	0.72	1.52	2.00	0.96	M4.0
G 122-8	0.51	0.46	0.87	0.52	0.75	1.31	1.96	1.11	M2.5
LP 19-292	0.46	0.44	0.82	0.44	0.71	1.44	1.97	0.95	M3.5
LP 792-14	0.30	0.36	0.82	0.32	0.60	1.96	2.04	1.75	M5.0
LP 264-45	0.25	0.34	0.85	0.29	0.59	2.27	2.09	1.57	M5.5
LP 374-99	0.31	0.46	0.82	0.36	0.64	2.08	2.00	1.60	M5.0
R 448	0.70	0.66	0.86	0.66	0.82	1.14	1.95	0.98	M0.5
LP 792-59	0.33	0.40	0.80	0.33	0.60	1.80	2.01	1.39	M4.5
LP 792-24	0.44	0.43	0.80	0.41	0.71	1.47	2.00	1.17	M3.5
LP 732-76	0.28	0.32	0.80	0.31	0.55	2.06	2.06	1.29	M5.5
LP 792-31	0.40	0.45	0.84	0.41	0.69	1.54	1.98	0.92	M4.0
LP 851-68	0.35	0.38	0.87	0.38	0.68	1.64	2.00	0.92	M4.5
LP 38-362	0.47	0.44	0.82	0.46	0.72	1.42	1.96	0.98	M3.5
G 197-31	0.45	0.38	0.76	0.45	0.71	1.54	1.95	0.92	M3.5
LP 908-5	0.26	0.37	0.83	0.32	0.63	2.69	2.17	0.77	M6.5
LP 794-19	0.31	0.31	0.75	0.35	0.66	1.73	2.02	0.93	M5.0
LP 674-14	0.35	0.38	0.85	0.38	0.71	1.82	2.03	0.95	M4.5
LP 908-21	0.33	0.34	0.74	0.33	0.60	1.75	2.03	1.28	M4.5
LP 734-29	0.25	0.20	0.78	0.30	0.59	2.05	2.04	0.94	M5.5
LP 39-66	0.51	0.48	0.88	0.50	0.77	1.39	1.94	0.96	M2.5
LP 794-23	0.27	0.35	0.77	0.29	0.56	2.13	2.02	1.57	M5.5
LP 170-66	0.31	0.33	0.81	0.34	0.61	1.80	2.00	1.00	M5.0
LP 794-38	0.37	0.39	0.82	0.38	0.67	1.61	2.02	0.94	M4.5
LP 614-67	0.43	0.49	0.84	0.45	0.71	1.46	1.98	0.97	M3.5
LP 794-49	0.37	0.40	0.82	0.39	0.67	1.67	1.98	1.52	M4.5
LHS6230	0.41	0.42	0.82	0.42	0.71	1.50	1.98	0.96	M4.0
G 197-53	0.43	0.49	0.85	0.45	0.72	1.47	1.97	0.98	M3.5
S52-34	0.39	...	...	0.38	0.66	1.83	1.98	2.04	M4.0
LP 794-53	0.34	0.36	0.81	0.35	0.65	1.76	2.02	1.22	M4.5
G 148-53	0.52	...	...	0.51	0.77	1.29	1.96	0.96	M2.5
LP 675-7	0.20	0.11	1.12	0.22	0.48	2.44	2.10	1.15	M6.5
LP 852-50	0.33	0.34	0.85	0.38	0.69	1.73	2.03	1.05	M4.5

Table 3—Continued

name	TiO5	CaOH	CaH1	CaH2	CaH3	TiO-a	Vo-a	H α	Sp. Type
LP 909-5	0.36	0.39	0.84	0.38	0.67	1.64	2.00	0.98	M4.5
LP 909-6	0.38	0.42	0.84	0.40	0.68	1.60	2.00	0.98	M4.5
LP 321-38	0.40	0.41	0.85	0.41	0.67	1.56	1.99	0.99	M4.0
G 59-34	0.34	...	...	0.33	0.63	1.78	1.97	1.24	M4.5
LP 377-54	0.35	...	...	0.39	0.69	1.71	1.97	0.91	M4.5
LP 853-27	0.36	0.40	0.80	0.37	0.66	1.81	2.04	1.53	M4.5
G 61-10	0.43	...	...	0.43	0.70	1.43	2.04	1.00	M3.5
LP 95-334	0.45	0.45	0.80	0.46	0.72	1.43	1.97	0.94	M3.5
G 61-13	0.39	...	...	0.44	0.71	1.56	1.94	0.95	M4.0
LP 853-38	0.47	0.47	0.87	0.44	0.72	1.39	1.99	0.96	M3.5
LP 20-439	0.47	0.45	0.83	0.46	0.74	1.42	1.98	0.96	M3.5
LP 676-70	0.44	0.44	0.82	0.43	0.72	1.42	1.97	0.94	M3.5
LP 377-90	0.81	...	...	0.73	0.87	1.06	1.98	0.94	M0.5
LP 131-75	0.33	0.34	0.84	0.35	0.64	1.88	2.02	0.96	M4.5
LP 496-48	0.29	0.33	0.84	0.37	0.68	1.84	2.02	0.89	M5.5
LP 172-4	0.31	0.31	0.75	0.34	0.64	1.81	1.98	0.98	M5.0
LP 267-403	0.35	0.35	0.81	0.38	0.67	1.66	2.02	0.93	M4.5
LP 20-514	0.57	0.52	0.81	0.49	0.73	1.30	1.98	1.14	M2.5
LP 796-24	0.35	0.40	0.81	0.37	0.65	1.71	2.02	1.14	M4.5
LP 736-27	0.36	0.38	0.81	0.37	0.65	1.64	2.00	1.22	M4.5
LP 172-53	0.40	0.42	0.86	0.43	0.71	1.59	2.00	0.94	M4.0
LP 21-95	0.77	0.74	0.91	0.77	0.89	1.10	1.92	0.96	M0.5
LP 910-62	0.33	0.35	0.73	0.34	0.62	1.79	2.01	1.40	M4.5
LP 617-34	0.36	0.41	0.85	0.40	0.69	1.73	1.99	1.62	M4.5
LP 323-26	0.60	...	...	0.58	0.80	1.24	1.95	0.94	M1.5
LP 218-89	0.25	0.26	0.78	0.29	0.59	2.11	2.06	0.93	M5.5
LP 132-189	0.65	0.59	0.82	0.61	0.81	1.18	1.93	0.99	M1.5
G 199-169	0.50	0.48	0.81	0.48	0.72	1.35	1.94	0.97	M3.0
LP 96-136	0.72	0.67	0.89	0.68	0.83	1.13	1.93	0.99	M0.5
LP 437-81	0.32	0.34	0.80	0.35	0.64	1.82	2.02	0.96	M5.0
LP 219-28	0.39	0.40	0.79	0.40	0.69	1.52	1.99	0.93	M4.0
LP 21-586	0.57	0.48	0.80	0.50	0.73	1.28	1.95	0.96	M2.5
G 200-4	0.42	0.43	0.83	0.45	0.71	1.45	1.93	0.98	M3.5
LP 856-6	0.39	0.41	0.83	0.40	0.71	1.49	1.99	0.93	M4.0
LP 798-49	0.37	0.44	0.87	0.40	0.71	1.60	2.01	0.95	M4.5
LP 220-13	0.25	0.33	0.87	0.26	0.55	2.78	2.17	1.53	M7.0
LP 133-377	0.36	0.40	0.82	0.38	0.64	1.75	1.99	1.46	M4.5
LP 912-49	0.25	0.36	0.85	0.31	0.62	2.17	2.02	1.30	M5.5
LP 220-50	0.29	0.37	0.85	0.33	0.62	1.98	2.03	1.42	M5.5
LP 679-32	0.27	0.35	0.92	0.35	0.69	1.91	2.08	0.92	M5.5
G 124-13	0.39	0.46	0.88	0.42	0.70	1.54	1.99	0.97	M4.0
LP 325-4	0.31	0.34	0.85	0.36	0.66	1.78	2.01	1.05	M5.0
LP 325-24	0.35	0.42	0.82	0.37	0.63	1.82	2.00	1.54	M4.5
LP 381-49	0.32	...	...	0.25	0.56	2.06	2.02	1.54	M4.5
LP 740-6	0.31	0.31	0.75	0.32	0.60	1.72	2.00	1.45	M5.0
LP 800-58	0.29	0.45	0.84	0.30	0.58	2.40	2.13	2.02	M6.5
LP 500-35	0.19	0.16	0.78	0.25	0.60	2.47	2.16	0.84	M6.5
LP 740-58	0.38	0.37	0.81	0.37	0.64	1.69	2.02	1.33	M4.5
LP 740-25	0.38	0.39	0.82	0.40	0.70	1.58	1.99	0.95	M4.5

Table 3—Continued

name	TiO5	CaOH	CaH1	CaH2	CaH3	TiO-a	Vo-a	H α	Sp. Type
LP 221-151	0.41	0.45	0.88	0.44	0.72	1.48	1.99	0.94	M3.5
LP 325-68	0.36	0.44	0.85	0.39	0.67	1.73	1.99	1.25	M4.5
LP 858-8	0.34	0.33	0.81	0.34	0.62	1.74	1.99	1.37	M4.5
LP 740-44	0.27	0.36	0.79	0.30	0.58	1.96	2.05	1.24	M5.5
LP 914-13	0.47	0.48	0.84	0.45	0.73	1.39	2.00	0.96	M3.5
LP 858-20	0.36	0.41	0.78	0.37	0.64	1.80	2.01	1.52	M4.5
LP 914-18	0.31	0.26	0.85	0.37	0.70	1.83	2.02	0.89	M5.0
LP 272-8	0.29	0.31	0.79	0.35	0.65	1.88	1.97	0.95	M5.5
LP 272-15	0.50	0.51	0.87	0.50	0.76	1.40	1.93	0.95	M3.0
LP 441-34	0.20	0.32	0.82	0.25	0.57	2.63	2.21	1.37	M7.0
LP 914-39	0.44	0.53	0.86	0.48	0.75	1.42	1.97	0.99	M3.5
LP 98-370	0.53	0.49	0.83	0.50	0.76	1.39	1.95	0.95	M2.5
LP 914-41	0.31	0.28	0.75	0.37	0.70	2.13	2.03	1.61	M5.0
LP 859-1	0.28	-0.12	1.02	0.27	0.64	2.90	2.28	1.25	M7.5
LP 442-72	0.43	0.50	0.86	0.47	0.74	1.48	1.95	0.96	M3.5
LP 222-65	0.23	0.22	0.79	0.31	0.63	2.33	2.09	2.34	M5.5
LP 136-136	0.39	0.34	0.80	0.39	0.67	1.67	1.97	1.00	M4.0
LP 443-16	0.36	0.43	0.86	0.43	0.71	1.67	1.99	1.11	M4.5
LP 443-17	0.31	0.31	0.78	0.35	0.65	1.78	2.00	0.97	M5.0
LP 916-16	0.38	0.44	0.91	0.40	0.69	1.58	1.97	0.92	M4.5
LP 177-102	0.40	0.42	0.80	0.43	0.70	1.59	1.97	1.26	M4.0
LP 22-420	0.34	0.34	0.80	0.36	0.61	1.87	1.96	1.50	M4.5
LP 860-46	0.38	0.31	1.07	0.34	0.69	2.16	2.09	2.01	M5.5
G 180-17	0.42	0.38	0.81	0.44	0.72	1.53	1.97	0.93	M3.5
G 225-41	0.57	0.55	0.87	0.56	0.79	1.29	1.93	0.97	M2.5
LP 385-9	0.35	0.42	0.76	0.38	0.68	1.65	1.98	0.99	M4.5
LP 224-38	0.23	0.26	0.86	0.30	0.64	2.18	2.08	0.94	M6.0
BD12:4492B	0.50	0.49	0.84	0.47	0.74	1.34	1.99	0.98	M3.0
LP 177-391	0.36	0.37	0.82	0.40	0.70	1.65	1.99	0.98	M4.5
LP 917-23	0.39	0.41	0.85	0.41	0.72	1.58	2.00	0.97	M4.0
G 225-54	0.34	0.37	0.83	0.38	0.65	1.88	1.95	1.79	M4.5
LP 445-56	0.92	...	...	0.92	0.94	1.02	1.97	0.95	K7
LP 43-79	0.47	0.41	0.78	0.41	0.65	1.51	1.94	1.21	M3.5
G 202-60	0.35	0.42	0.86	0.41	0.70	1.65	2.00	1.01	M4.5
LP 275-74	0.25	0.27	0.78	0.31	0.62	2.07	2.01	1.03	M5.5
LP 276-22	0.19	0.21	0.83	0.27	0.61	2.29	2.11	0.90	M6.5
LP 226-11	0.40	0.39	0.76	0.39	0.65	1.67	1.96	1.35	M4.0
LP 226-38	0.37	0.36	0.77	0.36	0.63	1.75	1.99	1.87	M4.5
LP 446-34	0.46	...	...	0.48	0.74	1.40	1.97	0.93	M3.5
G 203-50	0.34	0.32	0.74	0.35	0.60	1.66	1.98	1.28	M4.5
G 240-52	0.48	0.44	0.85	0.47	0.74	1.44	1.95	0.94	M3.5
LP 447-35	0.40	0.42	0.85	0.45	0.74	1.55	1.98	0.95	M4.0
LP 507-15	0.32	0.37	0.91	0.40	0.71	1.65	1.99	0.90	M4.5
LP 807-62	0.53	0.55	0.88	0.56	0.78	1.28	1.96	0.98	M2.5
LP 332-33	0.37	0.39	0.83	0.39	0.69	1.64	1.98	0.94	M4.5
LP 278-44	0.19	0.20	0.81	0.25	0.57	2.52	2.07	0.96	M6.5
LP 278-50	0.34	0.38	0.86	0.39	0.69	1.66	2.00	1.01	M4.5
LHS 3350	0.48	0.47	0.87	0.45	0.73	1.40	1.96	0.94	M3.5
LP 71-82	0.33	0.34	0.73	0.35	0.60	1.91	1.98	1.54	M4.5

Table 3—Continued

name	TiO5	CaOH	CaH1	CaH2	CaH3	TiO-a	Vo-a	H α	Sp. Type
G 206-3	0.47	0.45	0.76	0.44	0.68	1.38	1.95	0.97	M3.5
G 183-39	0.48	...	...	0.48	0.74	1.37	1.97	1.02	M3.5
G 205-21	0.44	0.49	0.84	0.47	0.74	1.43	1.94	0.95	M3.5
LP 182-4	0.29	0.29	0.87	0.38	0.68	1.78	2.00	0.88	M5.5
G 205-26	0.46	0.49	0.70	0.44	0.66	1.40	1.98	1.20	M3.5
LP 335-12	0.20	0.30	0.80	0.23	0.52	3.24	2.17	1.21	M6.5
LP 391-12	0.94	...	...	0.89	0.95	1.01	1.97	0.96	K7
G 206-41	0.36	0.35	0.73	0.37	0.64	1.61	2.00	1.00	M4.5
G 259-33	0.62	0.58	0.82	0.56	0.76	1.21	1.96	0.99	M1.5
LHS 3406	0.23	0.16	1.06	0.30	0.66	2.77	2.23	1.83	M7.5
G 184-22	0.48	...	...	0.44	0.68	1.32	2.02	0.99	M3.5
LP 141-7	0.40	0.41	0.81	0.43	0.69	1.53	1.94	0.98	M4.0
LP 141-11	0.41	0.49	0.84	0.45	0.72	1.50	1.95	0.97	M4.0
LP 230-40	0.26	0.30	0.74	0.34	0.62	1.93	1.99	1.55	M5.5
LP 754-14	0.21	0.31	0.82	0.31	0.64	2.22	2.11	0.92	M6.0
LP 694-36	0.37	0.38	0.78	0.39	0.64	1.69	1.99	1.19	M4.5
G 144-18	0.42	0.45	0.80	0.42	0.68	1.46	1.98	0.98	M3.5
LP 871-38	0.33	0.37	0.79	0.33	0.60	1.89	1.98	1.73	M4.5
LP 927-32	0.22	0.28	0.84	0.33	0.65	2.20	2.10	0.92	M6.0
LP 636-16	0.35	0.36	0.71	0.35	0.60	1.69	2.01	1.26	M4.5
LP 396-18	0.37	0.41	0.85	0.42	0.70	1.57	1.95	0.94	M4.5
LP 516-31	0.45	0.48	0.84	0.49	0.76	1.42	1.97	0.94	M3.5
R 772	0.50	...	...	0.52	0.79	1.32	1.97	0.95	M3.0
LP 397-8	0.39	0.41	0.83	0.43	0.72	1.55	1.98	0.97	M4.0
LP 397-10	0.22	0.27	0.85	0.29	0.60	2.37	2.08	1.51	M6.0
LP 457-38	0.67	...	...	0.64	0.82	1.16	1.97	0.94	M1.0
LP 698-2	0.25	0.31	0.88	0.35	0.69	2.03	2.05	0.98	M6.0
LP 758-16	0.29	0.25	0.70	0.30	0.56	1.66	1.99	0.93	M5.5
LP 930-22	0.33	0.31	0.81	0.38	0.68	1.73	2.01	0.99	M4.5
LP 698-29	0.40	0.42	0.83	0.44	0.72	1.55	1.97	1.00	M4.0
LP 874-18	0.30	0.30	0.78	0.35	0.63	1.77	2.00	0.99	M5.0
LP 983-5	0.45	0.44	0.78	0.44	0.67	1.47	1.90	1.27	M3.5
LP 638-50	0.26	0.32	0.81	0.33	0.61	2.13	2.02	1.23	M5.5
LP 759-23	0.35	0.38	0.82	0.40	0.68	1.75	2.01	1.42	M4.5
LP 759-25	0.21	0.29	0.77	0.27	0.56	2.46	2.05	1.34	M6.0
LP 699-32	0.28	0.31	0.75	0.31	0.59	2.17	2.05	1.60	M5.5
LP 759-47	0.31	0.29	0.81	0.36	0.69	1.83	2.04	0.97	M5.0
LP 1032-84	0.27	0.33	0.87	0.32	0.62	1.86	2.02	0.95	M5.5
CD-24:17099B	0.87	...	...	0.80	0.90	1.04	1.97	0.99	K7
LP 983-134	0.33	0.45	0.82	0.34	0.59	2.03	1.94	1.76	M4.5
LP 700-2	0.39	0.38	0.80	0.42	0.69	1.54	1.98	0.97	M4.5
LP 820-19	0.28	0.32	0.71	0.29	0.53	2.41	2.05	2.42	M5.5
G 215-48	0.43	0.42	0.76	0.42	0.68	1.46	1.97	0.96	M3.5
LP 876-6	0.39	0.43	0.85	0.44	0.73	1.56	1.96	0.95	M4.0
LP 821-14	0.42	0.44	0.85	0.47	0.73	1.49	1.96	0.98	M3.5
LP 237-32	0.44	0.44	0.81	0.40	0.65	1.51	1.97	1.39	M3.5
LP 521-18	0.27	0.33	0.82	0.32	0.59	2.30	2.03	1.53	M5.5
LP 401-10	0.25	0.35	0.81	0.31	0.59	2.32	2.05	1.73	M5.5
G 128-35	0.37	0.40	0.75	0.38	0.61	1.75	2.01	1.80	M4.5

Table 3—Continued

name	TiO5	CaOH	CaH1	CaH2	CaH3	TiO-a	Vo-a	H α	Sp. Type
LP 985-98	0.30	0.46	0.74	0.33	0.62	2.14	1.97	1.60	M5.0
LP 702-50	0.23	0.28	0.92	0.29	0.55	2.46	2.03	1.11	M5.5
LP 934-33	0.26	0.31	0.77	0.31	0.57	2.20	2.00	1.87	M5.5
LP 346-21	0.33	0.31	0.76	0.35	0.62	1.77	2.00	1.10	M4.5
R 247	0.65	0.58	0.85	0.54	0.79	1.18	1.97	0.98	M1.5
G 273-77	0.51	0.49	0.79	0.50	0.74	1.33	1.98	0.98	M2.5
LP 763-36	0.36	0.38	0.82	0.40	0.69	1.68	1.99	0.95	M4.5
LP 763-3	0.23	0.31	0.78	0.29	0.57	2.48	2.06	1.84	M5.5
LP 763-38	0.20	0.73	0.82	0.26	0.60	2.50	2.24	1.36	M7.5
LP 703-42	0.35	0.32	0.83	0.40	0.69	1.75	1.99	1.07	M4.5
LP 763-61	0.32	0.37	0.79	0.33	0.59	2.00	2.01	2.29	M4.5
LP 239-52	0.28	0.31	0.85	0.36	0.66	1.83	2.00	0.91	M5.5
LP 239-57	0.32	0.37	0.79	0.36	0.64	1.96	2.01	1.53	M5.0
G 130-31	0.36	0.46	0.85	0.42	0.70	1.75	1.99	1.81	M4.5

Note. —

Table 4. Photometry of NLTT dwarfs

name	α (2000)	δ	V	(B-V)	(V-R)	(V-R)	n_{obs}	σ_V	σ_{B-V}	σ_{V-R}	σ_{V-I}	J	H	K_S	M_J	d (pc.)
644- 39	0:06:13.0	-2:32:10	14.622	...	1.203	2.782	2	14	0	4	10	10.236	9.613	9.312	8.17±0.25	25.9
880-769	0:16:03.3	-30:58:42	13.719	...	0.988	2.104	1	...	...	...	...	10.449	9.890	9.605	6.48±0.25	62.2
584- 94*	0:17:40.6	-1:22:40	12.886	1.457	1.049	2.390	1	...	...	...	...	9.261	8.567	8.370	6.98±0.25	28.6
825- 48	0:20:50.5	-25:34:05	12.551	...	0.953	1.982	1	...	...	...	...	9.518	8.821	8.614	6.23±0.25	45.5
705- 15	0:21:39.4	-9:00:24	13.939	...	1.175	2.703	2	14	0	6	7	9.732	9.159	8.879	7.97±0.25	22.5
705- 22	0:24:25.1	-12:17:24	12.245	1.497	1.011	2.227	1	...	...	...	...	8.808	8.191	7.949	6.71±0.25	26.3
645- 48	0:34:38.9	-2:25:00	11.952	1.496	0.999	2.167	1	...	...	...	...	8.569	7.948	7.685	6.66±0.25	24.1
705- 65	0:35:38.0	-10:04:18	11.831	1.523	1.025	2.263	1	...	...	...	...	8.314	7.737	7.519	6.77±0.25	20.3
825-556	0:36:51.9	-26:15:33	14.704	...	1.136	2.591	2	53	0	0	0	10.647	10.053	9.786	7.81±0.25	37.0
826-141	0:50:16.0	-24:42:15	13.947	...	1.018	2.208	1	...	...	...	...	10.562	9.955	9.663	6.67±0.25	60.0
826-319	0:58:02.5	-23:20:42	14.083	...	1.086	2.446	2	7	0	0	9	10.349	9.758	9.482	7.11±0.25	44.5
586- 43	1:01:24.6	-1:05:58	13.385	...	1.173	2.713	1	...	...	...	...	9.243	8.637	8.333	7.73±0.25	20.0
766- 98	1:07:23.4	-17:37:41	11.185	1.228	0.765	1.424	1	...	...	...	...	8.869	8.250	8.099	5.37±0.25	50.1
707- 16	1:10:17.4	-11:51:17	12.663	1.544	1.143	2.632	2	16	4	5	9	8.622	7.956	7.656	7.63±0.25	15.8
- 1:167B*	1:18:40.1	0:52:27	10.689	1.395	0.868	1.679	1	...	...	...	...	8.003	7.366	7.165	5.77±0.25	27.9
G 274-24 ¹	1:24:27.6	-33:55:08	14.30:	...	1.26:	2.3:	2	45	0	12	28	10.00:	9.46:	9.03:	8.48±0.25	14.3
939- 44*	1:24:30.6	-33:55:01	15.490	...	1.356	3.146	2	19	0	13	12	10.539	10.002	9.664	9.26±0.25	18.0
767- 86	1:28:13.6	-16:14:29	14.345	...	1.062	2.362	1	...	...	...	...	9.700	9.071	8.834	5.99±0.25	55.2
767- 86	1:28:13.6	-16:14:29	12.564	1.476	0.920	1.859	1	...	...	...	...	9.700	9.071	8.834	5.99±0.25	55.2
768-113	1:33:58.0	-17:38:23	13.009	...	1.175	2.698	2	16	0	1	7	8.876	8.268	8.003	7.66±0.33	17.5
991- 84	1:39:21.7	-39:36:08	14.517	...	1.489	3.412	2	7	0	1	3	9.190	8.612	8.297	9.59±0.25	8.3
768-712	1:47:07.7	-14:24:44	13.206	...	1.136	2.601	2	30	0	7	19	9.202	8.664	8.371	7.46±0.25	22.3
708-634	1:50:56.4	-9:37:03	11.329	1.438	0.896	1.775	1	...	...	...	...	8.604	7.860	7.663	5.88±0.25	35.0
768-673*	1:54:20.9	-15:43:47	13.805	...	1.040	2.297	2	17	0	13	26	10.257	9.732	9.446	6.82±0.25	48.8
G 75-22	2:33:21.6	-5:34:25	12.358	1.263	0.765	1.485	1	...	...	...	...	9.943	9.260	9.160	5.47±0.25	78.3
886- 72	2:36:37.6	-31:14:01	14.037	...	1.098	2.501	2	13	0	10	14	10.298	9.644	9.396	7.14±0.25	42.9
G 75-35	2:41:15.1	-4:32:17	13.800	...	1.297	3.007	2	2	0	7	1	9.181	8.566	8.269	8.71±0.37	12.4
G 77-24	3:07:32.0	-6:36:46	15.422	...	1.372	3.161	3	57	0	55	57	10.393	9.812	9.509	9.30±0.25	16.5
G 160-54	4:13:45.8	-5:09:04	14.210	...	1.262	2.927	3	14	0	7	10	9.746	9.089	8.843	8.81±0.25	15.4
775- 48	4:31:19.7	-15:38:19	10.696	1.102	0.678	1.265	2	0	3	4	1	8.630	7.968	7.826	5.16±0.25	49.4
891- 46	4:59:24.3	-30:55:57	14.945	...	1.291	3.002	5	23	0	10	18	10.247	9.637	9.351	9.08±0.25	17.1
892- 22	5:13:47.2	-31:19:34	14.451	...	1.194	2.764	3	2	0	3	4	10.155	9.609	9.308	8.06±0.25	26.2
892- 40	5:21:15.8	-32:21:26	14.243	...	1.145	2.671	4	13	0	13	15	10.082	9.509	9.227	7.92±0.25	27.0
837- 16	5:43:04.5	-26:35:39	15.245	...	1.289	3.005	4	9	0	14	11	10.571	9.979	9.727	9.03±0.25	20.3
893- 17	5:45:50.3	-27:09:49	14.415	...	1.252	2.893	4	14	0	8	6	9.972	9.436	9.108	8.55±0.32	19.2
664- 13	8:05:36.9	-9:32:37	15.127	...	1.322	3.095	4	15	0	14	8	10.333	9.801	9.467	9.16±0.25	17.1
G 41-8	8:56:19.5	12:39:50	14.465	...	1.369	3.174	6	23	0	13	21	9.582	8.989	8.718	9.25±0.25	11.6

Table 4—Continued

name	α (2000)	δ	V	(B-V)	(V-R)	(V-R)	n_{obs}	σ_V	σ_{B-V}	σ_{V-R}	σ_{V-I}	J	H	K_S	M_J	d (pc.)
487- 10	9:11:31.9	12:37:24	13.022	...	1.040	2.332	4	9	0	1	6	9.402	8.772	8.564	6.94±0.25	31.0
787- 8	9:12:32.2	-17:11:22	14.148	...	1.171	2.716	3	6	0	8	14	9.946	9.301	9.018	8.07±0.25	23.8
787- 23	9:19:53.3	-18:48:36	14.561	...	1.121	2.569	4	17	0	7	18	10.602	9.960	9.715	7.45±0.25	42.7
G 162-22	10:10:47.1	-5:07:31	14.913	...	1.259	2.912	4	6	0	11	20	10.397	9.758	9.446	8.80±0.25	20.9
490- 42	10:37:55.2	12:46:36	12.507	1.558	1.087	2.458	4	7	8	4	7	8.785	8.140	7.900	7.11±0.25	21.7
490- 63	10:44:18.8	12:25:11	13.518	...	1.140	2.631	4	15	0	9	12	9.412	8.773	8.517	7.90±0.25	20.0
491- 51	11:03:21.3	13:37:57	12.992	1.658	1.195	2.752	5	36	28	11	17	8.731	8.138	7.860	8.07±0.25	13.6
672- 2*	11:08:06.5	-5:13:46	12.566	1.509	1.075	2.428	1	...	...	...	...	8.793	8.130	7.923	6.96±0.22	23.2
792- 60	11:26:50.7	-18:44:58	14.499	...	1.184	2.760	4	14	0	12	18	10.106	9.470	9.142	8.17±0.25	24.4
793- 24 ²	11:40:32.9	-16:33:43	12.30:	1.46:	0.96:	2.03:	1	...	...	...	...	9.077	8.332	8.117	6.28±0.25	36.3
613- 62	11:51:55.2	-1:31:31	15.640	...	1.412	3.255	4	28	0	28	32	10.569	10.011	9.664	9.40±0.25	17.1
908- 25	12:09:54.0	-29:20:15	14.719	...	1.231	2.872	5	15	0	16	11	10.228	9.609	9.319	8.55±0.32	21.7
852- 26	12:14:57.6	-22:12:59	14.948	...	1.183	2.720	4	38	0	20	24	10.732	10.091	9.823	8.05±0.25	34.4
795- 15	12:25:32.1	-15:59:41	15.185	...	1.427	3.339	4	30	0	22	26	9.967	9.379	8.996	9.55±0.25	12.1
909- 36	12:47:36.5	-28:33:18	14.134	...	1.071	2.417	4	10	0	9	13	10.404	9.798	9.500	7.14±0.25	44.9
G 150-17	13:35:50.7	14:41:12	12.399	1.512	1.064	2.410	3	7	3	3	4	8.659	7.996	7.797	7.13±0.25	20.2
798- 78 ³	13:44:36.1	-16:53:28	13.90:	...	0.40:	0.79:	1	...	...	...	...	10.171	9.615	9.359	7.01±0.25	42.9
738- 14	13:48:07.3	-13:44:30	15.098	...	1.303	3.044	3	8	0	4	11	10.421	9.990	9.688	8.82±0.25	20.9
741- 4	14:45:26.6	-13:11:34	14.641	...	1.176	2.703	3	13	0	8	18	10.416	9.845	9.577	7.96±0.25	31.0
861- 22	16:06:29.5	-24:07:24	14.999	...	1.307	3.006	3	30	0	23	49	10.395	9.811	9.528	8.87±0.25	20.2
917- 20	16:07:03.5	-30:41:52	14.277	...	1.039	2.396	2	26	0	10	9	10.543	10.020	9.764	7.05±0.25	49.9
869- 19	19:42:00.6	-21:04:05	13.210	1.671	1.258	2.905	2	20	28	9	18	8.699	8.080	7.810	8.74±0.25	9.8
925- 37	19:43:51.7	-32:24:03	11.667	1.526	1.038	2.295	2	6	3	2	9	8.130	7.532	7.253	6.86±0.25	17.9
693- 21 ⁴	19:43:59.3	-4:43:20	11.27:	1.39:	0.88:	1.77:	1	...	...	...	...	8.465	7.783	7.591	5.97±0.25	32.1
869- 26	19:44:53.7	-23:37:59	14.078	...	1.380	3.192	3	16	0	4	4	9.086	8.571	8.266	9.28±0.25	9.2
754- 8	19:57:52.0	-10:53:04	14.350	...	1.291	2.975	3	10	0	2	6	9.770	9.177	8.862	8.85±0.25	15.3
870- 65	20:04:30.7	-23:42:01	13.007	1.659	1.242	2.887	1	...	...	...	...	8.559	8.002	7.687	8.54±0.32	10.1
870- 45	20:10:55.5	-25:35:08	13.108	1.541	1.052	2.347	2	8	9	6	15	10.217	9.627	9.357	7.17±0.37	40.7
815- 1	20:20:07.1	-19:39:02	12.329	1.528	0.994	2.132	2	14	13	6	9	9.004	8.400	8.170	6.54±0.25	31.0
756- 3	20:46:43.6	-11:48:13	13.762	...	1.240	2.867	2	24	0	6	16	9.343	8.710	8.429	8.52±0.32	14.6
872- 27	20:56:27.1	-24:00:12	15.156	...	1.365	3.152	3	7	0	3	10	10.261	9.688	9.404	9.23±0.25	16.1
928- 44	21:01:12.6	-30:46:04	14.316	...	1.171	2.686	2	30	0	7	27	10.138	9.562	9.289	7.94±0.25	27.5
873- 9	21:11:13.6	-22:48:17	14.670	...	1.283	2.976	3	12	0	5	6	10.006	9.419	9.131	9.03±0.25	15.7
873- 77	21:13:08.2	-26:24:59	13.602	...	1.051	2.362	2	21	0	8	12	9.982	9.291	9.043	7.02±0.25	39.1
638- 75	21:31:59.6	-1:20:03	13.782	...	1.108	2.561	2	2	0	0	0	9.860	9.270	9.031	7.34±0.25	31.9
874- 62	21:46:45.4	-21:17:46	13.660	...	1.230	2.838	2	4	0	1	4	9.295	8.689	8.443	8.34±0.32	15.6
818- 34	21:48:53.0	-19:47:26	14.848	...	1.294	3.029	3	10	0	13	16	10.097	9.521	9.211	9.11±0.25	15.8

Table 4—Continued

name	α (2000)	δ	V	(B-V)	(V-R)	(V-R)	n_{obs}	σ_V	σ_{B-V}	σ_{V-R}	σ_{V-I}	J	H	K_S	M_J	d (pc.)
758- 62	21:56:19.8	-10:20:16	14.587	...	1.321	3.063	3	2	0	5	3	9.965	9.459	9.120	8.94 ± 0.25	16.0
759- 6	21:57:12.6	-9:03:26	15.110	...	1.379	3.168	3	8	0	6	3	10.172	9.519	9.228	9.31 ± 0.25	14.9
1032- 66	22:08:16.2	-42:42:58	12.675	1.535	1.058	2.353	2	0	2	1	2	9.063	8.484	8.169	6.97 ± 0.25	26.2
1032-116	22:21:49.7	-42:09:02	14.737	...	1.277	2.925	2	5	0	7	14	10.217	9.602	9.317	8.78 ± 0.25	19.4
931- 52	22:23:02.2	-29:21:53	14.543	...	1.141	2.638	2	1	0	7	0	10.461	9.878	9.561	7.64 ± 0.25	36.6
931- 54	22:23:18.0	-27:09:14	14.647	...	1.212	2.784	2	2	0	2	4	10.418	9.830	9.490	7.88 ± 0.25	32.2
984- 92*	22:45:00.0	-33:15:25	13.381	...	1.286	3.002	2	26	0	4	14	8.683	8.045	7.774	9.08 ± 0.25	8.3
821- 16	22:46:23.8	-16:56:52	12.611	1.499	1.034	2.315	2	0	1	4	4	9.079	8.493	8.212	6.84 ± 0.25	28.1
876- 10	22:48:04.4	-24:22:07	12.618	1.683	1.273	2.944	2	12	25	4	3	8.106	7.537	7.219	8.81 ± 0.25	7.2
932- 81	22:48:38.3	-31:08:41	12.335	1.560	1.111	2.531	2	8	2	2	3	8.435	7.826	7.484	7.43 ± 0.25	15.9
985- 24	22:49:24.6	-34:45:49	14.558	...	1.211	2.780	2	4	0	2	3	10.249	9.666	9.327	8.16 ± 0.25	26.2
985- 32	22:51:23.6	-34:19:35	11.516	1.496	0.970	2.051	2	4	4	0	2	8.378	7.749	7.482	6.35 ± 0.25	25.5
821- 27	22:52:05.2	-15:32:51	15.079	...	1.337	3.116	2	7	0	3	5	10.275	9.669	9.359	9.20 ± 0.25	16.4
985- 48	22:54:54.9	-33:34:16	11.699	1.472	0.946	1.950	2	8	4	1	4	8.680	8.040	7.814	6.18 ± 0.25	31.6
821- 54	23:03:59.7	-16:12:06	14.631	...	1.250	2.863	2	26	0	7	25	10.163	9.649	9.286	8.47 ± 0.32	21.8
642- 48	23:20:57.6	-1:47:37	13.662	...	1.204	2.792	2	5	0	4	3	9.380	8.726	8.498	8.15 ± 0.25	17.6
822-101	23:31:25.0	-16:15:57	13.122	1.535	1.170	2.707	2	0	7	0	1	8.888	8.286	7.996	8.02 ± 0.25	14.9
763- 16*	23:33:21.9	-12:40:07	14.706	...	1.236	2.871	2	36	0	14	32	10.267	9.710	9.415	8.47 ± 0.32	22.9
987- 23	23:46:38.2	-34:10:01	12.582	1.619	1.090	2.443	2	0	10	0	5	8.837	8.230	8.004	7.10 ± 0.25	22.3
763- 82	23:54:50.2	-9:57:01	12.189	1.450	1.038	2.345	2	5	6	0	1	8.572	7.972	7.706	6.96 ± 0.25	21.0
G 158-8	23:55:55.1	-13:21:23	13.427	...	1.167	2.703	2	12	0	0	14	9.273	8.685	8.430	7.96 ± 0.25	18.3
764- 40	23:58:13.6	-17:24:33	11.960	1.489	1.046	2.337	2	3	7	0	4	8.359	7.722	7.403	7.01 ± 0.25	18.6

Note. — Column lists the star name from the NLTT; columns 2 and 3 give the position from 2MASS; columns 4-7 list the photometry, column 8 the number of observations, and, for multiple observations, columns 9-12 give the formal residuals about the mean, in millimag; columns 13-15 list the 2MASS photometry; column 16 gives the derived absolute magnitude and uncertainty; and column 17 gives the corresponding distance in parsecs.

Notes to individual stars:

1. G 274-24: both 2MASS and optical photometry include close binary companion, sep. $\sim 2''$. Jao *et al.*(2003) list this source as GJ 2022AC, and give $\delta V = 0.06$ mag. Magnitudes adjusted by +0.75 mag. LP 939-44 (GJ 2022B) is 2MASS 01243060-3355014, J=10.55, H=10.009, K=9.682.
2. LP 793-24: optical photometry includes LP 793-25, sep. $4.5''$, $\delta m \sim 0.2$ mag; V magnitude adjusted by +0.75 mag.
3. LP 798-78: optical photometry includes 2 background stars, sep. $\sim 5''$, $\delta m \sim 1$ and 2 mag. V magnitude adjusted by +0.35 mag.
4. LP 693-21: optical photometry includes a background star, sep. $7''$, $\delta m \sim 1.5$ mag; V magnitude adjusted by +0.25 mag.